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CONGENITAL ECTODERMAL DEFECT *

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Anomalies of the epidermis and its appendages, due to faulty evolution of the epiblastic layer of the blastoderm, are numerous. In the nosology of dermatology such conditions are found among the hypertrophies, atrophies, new growths and affections of the appendages. The congenital keratodermas, the ectodermal nevi, and the more or less circumscribed ectodermal aplasias, are considered by many to represent abnormalities which may be traced to faulty epiblastic development. Among these conditions are found pure types and combinations: some are common; others are uncommon; some are rare.

The term ectodermal defect, as used in the literature, has been employed to signify the incomplete development of the epidermis or its appendages; or its absence in circumscribed areas. Under this term, therefore, the keratodermas and the nevi may be disregarded.

Congenital atrichosis, localized, generalized, and even universal, with and without deformation of the nails and teeth, is common. It is accompanied at times by nevi, keratoderma, epidermolysis bullosa hereditaria, etc. A large number of such cases have been reported by Kingsbury,[1] Wende,[2] C. J. White,[3] Ziegler,[4] Hyde,[5] Pincus,[6] and many others. Bettmann[7] and others, especially Hyde, Dubreuilh and Petges,[8]

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1. Kingsbury: J. Cutan. Dis. **24**:419, 1906.
2. Wende, G. W.: J. Cutan. Dis. **1**:14, 1904.
3. White, C. J.: J. Cutan. & Genito-Urin. Dis. **15**:220, 1896.
4. Ziegler, P.: Arch. f. Dermat. u. Syph. **39**:213, 1897.
5. Hyde, J. N.: J. Cutan. Dis. **27**:1, 1909.
6. Pincus, F.: Arch. f. Dermat. u. Syph. **50**:347, 1899.
7. Bettman: Arch. f. Dermat. u. Syph. **60**:343, 1902.
8. Dubreuilh, W., and Petges, G.: Ann. de dermat. et syph. ser. 4, **9**:257, 1908.

Buschke,[9] and Waelsch,[10] make a distinction between the comparatively common congenital alopecia and the uncommon hypotrichosis. In the former, hair is present at birth. This soon falls out, after which failure to regenerate may be partial or complete. Hair follicles, more or less atrophic, are present. As a rule, only the hairy parts—scalp, eyebrows, beard, etc.—are involved, the lanugo hair of the glabrous skin being preserved. Hypotrichosis, which represents an early arrest of development, includes the lanugo hair; and the hair follicles are absent in the affected parts.

Congenitally deformed nails are not uncommon, especially in patients afflicted with other congenital affections. Occasionally one encounters a congenital absence of the nails in association with epidermolysis bullosa hereditaria, severe ichthyosis, etc. True congenital anonychia, however, is rare, as has been shown by Heidingsfeld.[11] Congenital deformation of the teeth is exceedingly common, but complete absence of the teeth is uncommon. Asteatosis, associated with congenital affections is common, but absence of sebaceous glands over extensive surfaces is rare. The sweat glands, in congenital conditions, are often atrophic or degenerated, but their absence from most of the body surface is extremely uncommon.

Complete absence at birth of the epidermis and appendages, in restricted areas, is occasionally encountered. Such examples have been recorded by Adair and Stewart,[12] Hahn,[13] and others, and especially by Abt,[14] who found thirty-eight cases in the literature and added one of his own.

From the foregoing, it may be inferred that various grades of congenital aplasia of the skin, nails, hair and teeth, and even of the sebaceous glands and sweat glands, alone or in combination, are of fairly frequent occurrence. It is much more unique to encounter patients who present congenital anomalies, ranging from deformation to complete absence, of all or nearly all of the cutaneous structures originating from the epiderm.

In 1920, Goeckermann [15] reported the case of a patient who presented more or less aplasia of most of the cutaneous ectoderm. The

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9. Buschke, A.: Arch. f. Dermat. u. Syph. **108**:27, 1911.

10. Waelsch, L.: Arch. f. Dermat. u. Syph. **103**:63, 1910.

11. Heidingsfeld, M. L.: Tr. 17th Internat. Congr. Med., London, 1913, Sect. 13, Pt. 2, p. 93.

12. Adair, F. L., and Stewart, C. A.: Congenital Defect of the Skin of the New-Born, Am. Jour. Dis. Child. **27**:60, 1924.

13. Hahn, W. J.: J. d. Chir. u. Angenheilk. **30**:156, 1840.

14. Abt, I. A.: Congenital Skin Defects, Am. Jour. Dis. Child. **14**:113 (Aug.) 1917.

15. Goeckermann, W. H.: Congenital Ectodermal Defect, with Report of a Case, Arch. Dermat. & Syph. **1**:396 (April) 1920.

mesoderm, as in all such cases, was involved to some extent, but such involvement may be incidental. Goeckermann combed the literature thoroughly, and succeeded in finding records of six similar cases. In fact, the cases were found to be so analogous that he believes they form a distinct and easily recognizable type, an opinion in which we concur. To this group he has applied the term high-grade or major ectodermal defect. We are greatly indebted to Goeckermann's article, with its bibliography.

Guilford,[16] an American dentist, was the first to report a case of this kind (1883). Tendlau,[17] in 1902, reported a case belonging to this group. Ascher [18] presented a child, who exhibited major ectodermal defect, before the anthropologischen Gesellschaft (date unknown), at which time there was a discussion by Virchow. In 1911, Wechselmann and Loewy [19] published an article in which they record three cases. They first describe the patient previously exhibited by Ascher. They mention the comments made by Ascher and Virchow,[20] but fail to give a definite reference. They then describe the patient previously reported by Tendlau, with additional clinical and experimental data. They also add an unrecorded example of the affection. Christ,[21] in 1913, added the fifth case to the literature and Strandberg [22] recorded another in 1918. The number of cases so far reported in detail is seven. Two probable cases have been included in family trees by Wechselmann and Loewy, and Christ, but they were not studied or described. These cases, together with that of our patient, make a total of ten cases. The fact that Wechselmann and Loewy's Case 1 and Case 2 had been previously reported, makes it a little difficult to identify the patients, decide on the exact number in the literature and to arrange the chronology. We believe that the subjoined chronologic table of bona fida cases is correct.

Goeckermann is of the opinion that the condition will prove less rare than indicated by the paucity of recorded cases. This may be so, because these patients present a facies that is strongly suggestive of syphilis. It is possible, therefore, that there has been a number of such cases diagnosed as congenital syphilis, treated as such and not recorded. However, the appearance of these patients is typical and conspicuous, and it is doubtful whether an experienced dermatologist, in whose hands such a patient would eventually fall, would fail to recognize an unusual

16. Guilford, S. H.: Dental Cosmos **25**:113, 1883; ibid., **35**:809, 1893.
17. Tendlau, B.: Virchow's Arch. f. path. Anat. **167**:465, 1902.
18. Ascher, quoted by Wechselmann and Loewy.
19. Wechselmann, W., and Loewy, A.: Berl. klin. Wchnschr. **48**:1369, 1911.
20. Virchow, quoted by Wechselmann and Loewy.
21. Christ, J.: Arch. f. Dermat. u. Syph. **116**:685, 1913.
22. Strandberg, J.: Nord. Med. Arch. **51**:1 (Oct. 18) 1918, Int. Med. Sec., No. 1.

and extensive arrest of development of the cutaneous ectoderm. The fact that few of the older dermatologists can recall cases of this kind warrants the belief that this particular type of ectodermal defect is rare.

The subjoined case report is of a patient whom we regard as a typical example of major ectodermal defect, or what Highman, when he saw the patient, called an ectodermal monstrosity. The patient was presented by Dr. Wise before the New York Academy of Medicine, Section on Dermatology and Syphilology, Oct. 3, 1922.[23]

TABLE 1.—*Chronologic Table of Cases*

Chronologic Number	Initials of Patient	Date	Author	Remarks
1	P. W.	1883	Gulliford	
2	M. H.	....	Ascher.....	Presented at a society meeting; later (1911) Wechselmann and Loewy describe this patient in their article as Case 1, with comments by Ascher and Virchow, but no reference
3	H. Z.	1902	Tendlau.....	Also reported in Wechselmann and Loewy's article (1911) as Case 2, with reference
4	W.	1911	Wechselmann and Loewy	Reported in their article as Case 3
5	.....	1913	Christ	
6	P. S.	1918	Strandberg	
7	.....	1920	Goeckermann	
8	C. R.	1924	MacKee and Andrews.....	This patient was presented by Dr. Wise before the N. Y. Academy of Medicine, Sect. Dermat., Oct. 3, 1922 (Arch. Dermat. and Syph. **7**:250, 1923)

REPORT OF A CASE

History.—C. R., a youth, aged 14, an American, a public-school student, whose father and mother, who were living and in good health, were Jews, and were born in Russia. They showed no evidence of any disease, nor were there any physical or mental defects. There was no history of syphilis, tuberculosis, alcoholism, insanity or physical defects in the antecedents. The patient's mother said there had been no miscarriages or still-births. Her Wassermann reaction was negative. The father's blood was not examined.

The patient had a brother, aged 11, and a sister, aged 4. There have been no other children. The brother and sister were in good health; they were normal mentally and physically. The brother's Wassermann test was negative. Permission to make a Wassermann test for the sister was not obtainable.

The gestation and accouchement were normal. As a baby, the patient was somewhat delicate, but there were no symptoms of disease, such as syphilis, tuberculosis, etc. There was an indefinite history of scalp trouble during infancy. During childhood, the patient had measles and pneumonia.

There were but two deciduous teeth (superior central incisors) which were shed at about the sixth year, after which the present teeth appeared. At this time, it was particularly remarked that there was almost no scalp hair. As he

23. Wise, F.: Arch. Dermat. & Syph. **7**:250 (Feb.) 1923.

grew older, he became conscious of his unusual appearance and, also, that he never sweat and that he felt uncomfortable during hot weather. His mother avers that most of the cutaneous defects were present at birth, while some were not noticed until late infancy or early childhood.

Examination.—The patient possessed a frail physique. His height was 5 feet, 4 inches; his weight, 100 pounds (45 kg.). His general health was good. He

Fig. 1.—Congenital alopecia with congenital deformation of nails. Note paucity of scalp hair and absence of eyebrows. This represents a fairly common type of congenital ectodermal aplasia.

complained of feeling uncomfortable, fatigued, depressed, faint, dizzy and oppressed on hot days, or when in a very warm room. These symptoms could be lessened by avoiding heat, by taking cold baths, or keeping the clothes damp and by relaxation. He was noticeably short of breath when taking mild physical

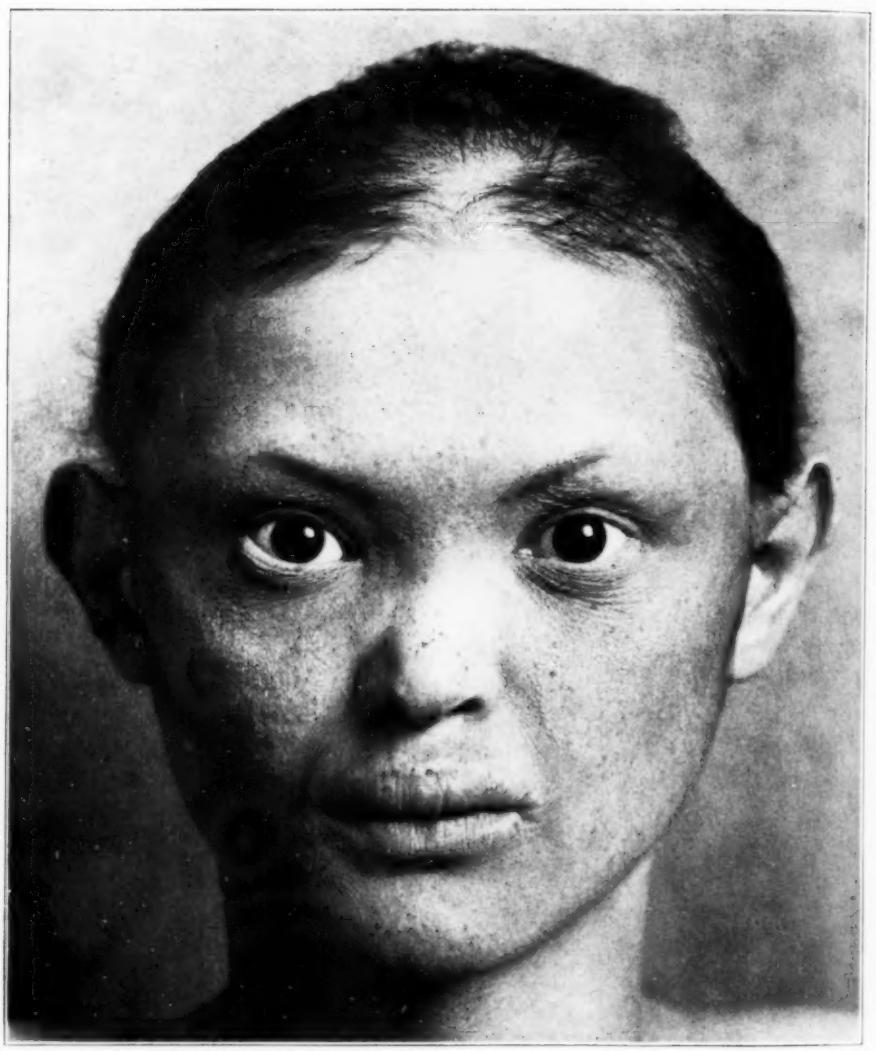

Fig. 2.—Patient C. R.; major type of ectodermal defect. Note paucity of scalp hair, eyebrows and eyelashes; saddle nose; protrusive upper lip; pseudorhagades; papular lesions; lack of definition of vermilion border of lips; mongolian facies.

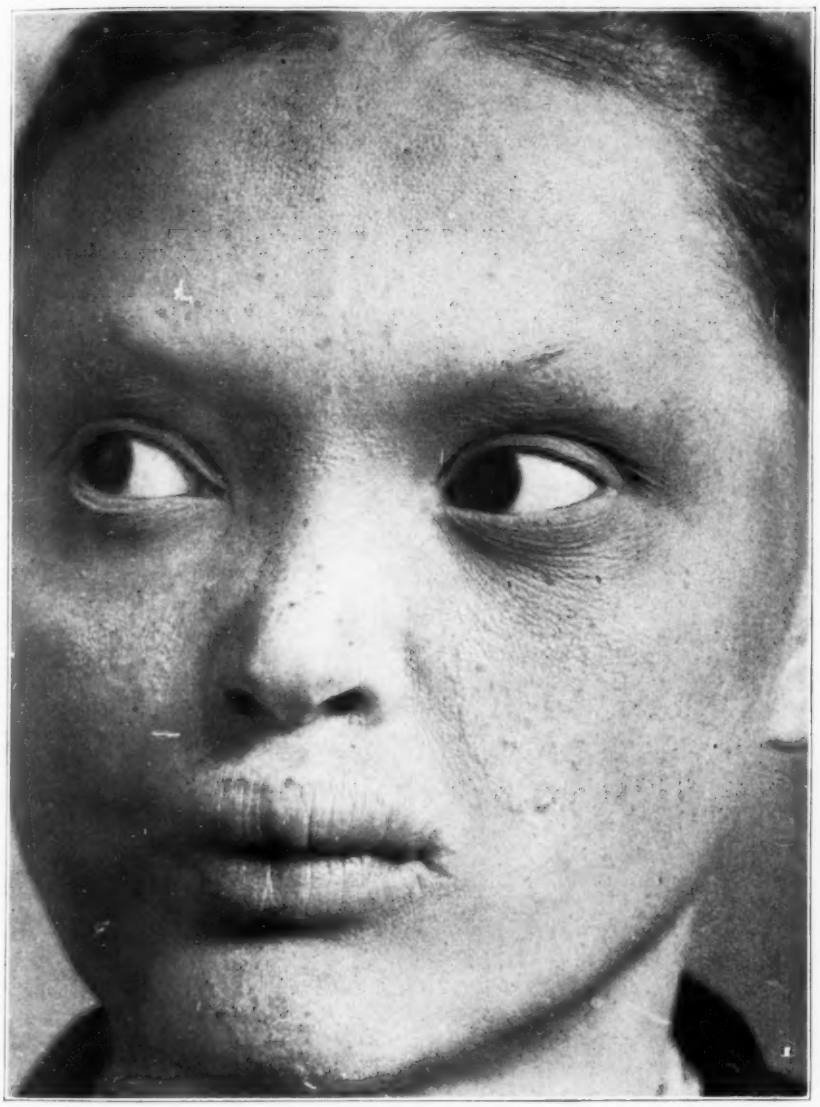

Fig. 3.—Close view showing confluent papules of forehead and papular lesions on cheeks and upper part of nose; also the wrinkles in the skin and the defect at the oral commissures.

exercise, especially in hot weather. He never had conscious perspiration; not even when exercising during hot weather. After numerous interviews we gained the impression of normal mentality, in spite of a voice that consisted of a high-pitched monotone.

The scalp was thin, smooth and dry; it was not scaly; it was freely movable. The scalp hair was sparse; it was of a fine soft texture and of normal length.

Fig. 4.—Side view showing prominent supraorbital ridges, depressed nasal bridge, protrusive upper lip, small lobe of ear and paucity of scalp hair.

The face was thin, the cheek bones high and wide, and the supra-orbital ridges prominent. The lower half of the face was narrow. The nasal bridge was markedly depressed (saddle nose). The lower end of the nose was small and upturned. The nostrils were large, wide and conspicuous. The interior of the nose was normal. There was no history of nasal discharge, "snuffles,"

ulceration, etc. The sense of smell was normal. The nose and the lower part of the face, were deflected to the right. For instance, the left buccal commissure was in a vertical plane with the inner canthus of the left eye, while a line from the right commissure reached the left eye near its center.

The outer two thirds of the eyebrows were devoid of hair, and the hair on the inner third of the arches was exceedingly sparse. There were only a few scattered eyelashes. The conspicuous supra-orbital ridges, together with the poorly defined scalp hair line, gave the impression of a high, prominent forehead. The eyes slanted upward; that is, the external canthus was higher than the inner canthus. This produced a mongolian facies.

The upper and lower eyelids depicted numerous, fine "senile" wrinkles. Similar wrinkles were noted near the nasolabial folds. At the buccal commissures, especially the left commissure, were coarse radiating depressions which simulated scars subsequent to syphilitic rhagades. Similar but less conspicuous depressions were situated at the junction of the nose with the upper lip.

Fig. 5.—Deformation of the upper front teeth.

Both lips were large, but the upper lip was particularly heavy and protrusive. The vermilion border of the lips was poorly defined. The lips were dry, and they showed vertical lines which were more numerous and more pronounced than normal.

Scattered over the entire face were innumerable, slightly yellowish, opaque, soft papules. They ranged in size from bare perceptibility to that of the head of an ordinary pin. On the forehead, over the glabella, and in the nasolabial folds, the lesions were profusely aggregated; elsewhere they were sparse. On the forehead, the lesions were so numerous and so closely crowded as to form a delicate mosaic. The papules were oval, smooth and convex or even slightly acuminate. For the most part, they were opaque and of a fawn color. A few on the eyelids and in the nasolabial folds were semitransluscent, white and firm. These lesions bore a slight resemblance to milia. All the papules had a patulous follicular orifice centrally located, which suggested that the lesions were of pilosebaceous origin.

The beard was present, in amount normal for the age of the patient. In addition to the hairs of the bearded region, lanugo hair was scattered over the

face. There was normal pigmentation of the face, with scattered freckles, from exposure to the sun. The lobes of the ears were small and they were attached to the cheeks.

The tongue, palate, uvula and tonsils were normal. The superior dental arch was narrow; the hard palate was markedly convex. The sense of taste was normal as was the buccal mucosa.

The patient had five teeth in the upper jaw apparently to be classified as follows, although they were so badly deformed that accurate identification was impossible: two central incisors which were widely separated, one bicuspid, and a right and left first molar. A molar on the left side was the only tooth in the lower jaw. The teeth were firmly embedded, and there were no cavities. The incisors were somewhat gimlet shaped. The incisors and the bicuspids were

Fig. 6.—Photograph of a plaster model of the teeth and dental arches, which illustrates the absence of many teeth, deformation of the teeth and narrowness of the jaws.

notched and somewhat twisted, but there was no resemblance to Hutchinsonian teeth. Roentgenograms revealed the absence of dental germs or unerupted teeth in both dental arches. The alveolar process appeared to be deficient in inorganic salts.

The eyes were normal for vision. The pupils reacted to both accommodation and light.

The chest, back and abdomen were well formed, and they were in proportion to the rest of the body. There was no lanugo hair on any of these parts. The scapulae were not of the scaphoid type. There was sparse growth of very fine hair in the axillae. The mammae were normal.

The arms and forearms were normal in general appearance, except that there was no lanugo hair. The hands and fingers were normal in size and shape. The

backs of the hands were free from even lanugo hair. The palms were thick (hyperkeratotic), wrinkled and very dry, but not scaly, fissured, or erythematous. The nails were flat, with free lateral margins; that is, these margins were flush with the skin instead of being embedded. The nails were free from pitting, ridges, furrows and leukonychia.

The thighs, legs and feet were anatomically normal. There were no saber tibiae. Lanugo hair was absent. The toe nails were normal. The soles were slightly hyperkeratotic. The keratotic condition of the palms and soles suggested the congenital entity known as keratosis palmaris and plantaris.

With the exception of a slight hyperplasia, the genitals were normal. There was a normal amount of pubic hair, which was dark brown and coarse, and which grew in the female line, a feature that was remarked also by Strandberg.

The skin of the entire body was thin, fair, smooth, glossy, movable, pliable and excessively dry.

There was no adenopathy of the lymphatic glands.

The heart was normal in size and location; the sounds were good; there were no murmurs; the arteries and blood pressure were normal. At the apex of the left lung, anteriorly and posteriorly, there was a stridor which was apparently transmitted from the throat. There was no dulness and there were no râles. The excursion of the diaphragm was normal. Examination of the abdomen was negative; the edges of the spleen and liver were not palpable.

Neurologic Examination.—Coordination, reflexes, muscular strength, sensation, and cranial nerves were normal.

The patient was in the seventh grade of the New York City public schools. His chronologic age was 14 years, 1 month; his mental age, 10 years, 10 months. Intelligence quota, 75 per cent., which is a very good rating. His cooperation, insight and judgment were unusually good for the chronologic age. There were no disturbances of the endocrine glands. His appearance was probably mostly due to racial causes and his Tartar ancestors.

Serology.—The blood Wassermann reaction was negative. Spinal fluid examination revealed: cells, 3; globulin (Pandy test) negative; colloidal gold test, negative. The fluid was clear, colorless, and the pressure normal.

Basal Metabolism.—The results of the basal metabolism test, conducted by the Russell Sage Institute of Pathology, follow: Of the calories produced at rest, the normal proportion of about 25 per cent. was given off in the form of water vapor. Of this water, only one-third was thrown off by the lungs. The remainder was excreted by the skin. At rest, therefore, at ordinary room temperature, his metabolism for heat and for water was indistinguishable from that of a normal person. When, however, the patient exercised, or when he was exposed to hot, dry air, elimination of water was not increased to the normal amount. As a result, there was a pronounced elevation of temperature, which is not seen in normal persons under similar conditions. When exposed to hot, dry air, the patient's temperature could be prevented from exceeding 100 F. for two hours by constantly sprinkling his skin with cool water; whereas it would rise to 101 F. in twenty-nine minutes without such treatment.

Pathologic Histology.—Under local anesthesia by ethyl chlorid, and with the use of a sharp, oval, biopsy punch, a small piece of tissue was removed from the extensor surface of the left forearm, and a papule was removed from the region of the left nasolabial fold. A few weeks later, a second papule was removed from the left cheek, close to the nose, under procain local anesthesia. The skin and subcutaneous fat were included in the biopsies. The tissue was

Fig. 7.—Roentgenogram of left superior and inferior maxillae. Note the absence of unerupted teeth and dental germs.

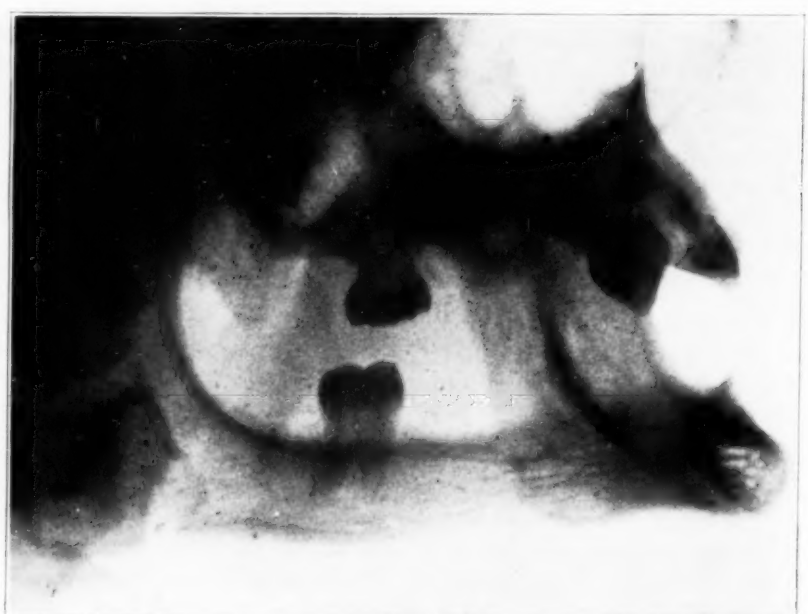

Fig. 8.—Roentgenogram of right superior and inferior maxillae. Note the absence of unerupted teeth and dental germs.

fixed in Bouin's solution, embedded in paraffin, cut serially, and stained with hematoxylineosin, a stain containing eosin, orange G and carbol-fuchsin, and Weigert's elastic tissue stain.

The following description of the pathologic histology is based on a study of all the serial sections.

Tissue from the Face (the Papule): Epidermis: The horny layer was homogeneous, compact and adherent: it was slightly thickened, the hyperplasia being enhanced in the region of the follicles. The granular layer stained heavily. For the most part it consisted of a single layer of cells, but in places, especially in the vicinity of the follicles, there were from two to four layers of cells. The

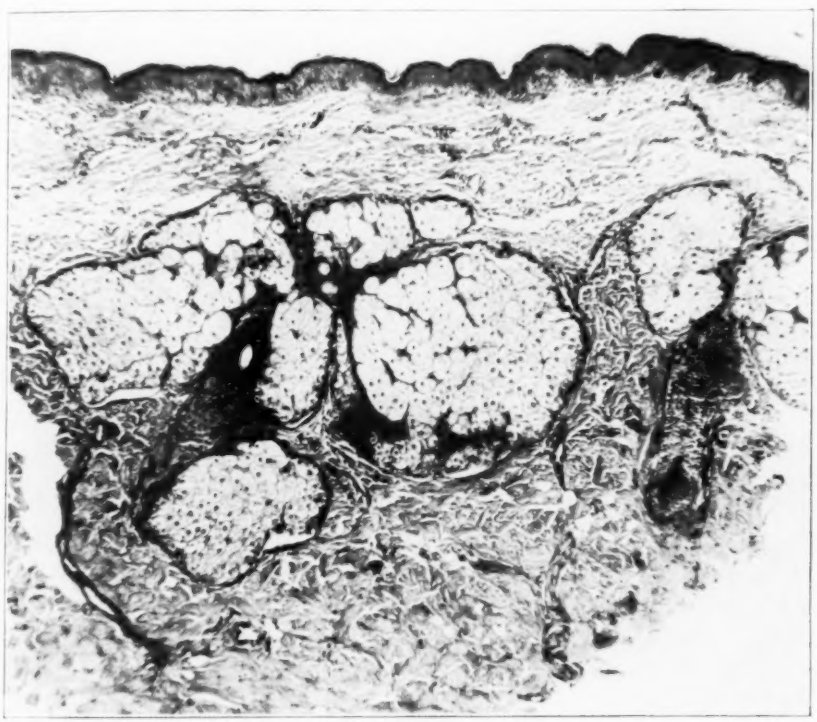

Fig. 9.—Low-power photomicrograph of tissue removed from the face: shows hair follicles and sebaceous glands but no sweat glands; dilatation of the blood vessels.

stratum lucidum was not well defined. The rete ranged in thickness from five to fifteen layers of cells. Both the thin and the thick portions were near the hair follicles. In the thin portion, the cells were compressed. The mucous layer stained well; in general, the cells were normal and the prickles showed distinctly, which might indicate a slight intercellular edema. For the most part, the basal layer was well differentiated, but near the follicles it was often disorganized. The pegs were numerous, small, and irregular in size and shape.

Derma: There was a slight intercellular and intracellular edema of the collagen as evidenced by a separation of the bundles and by tinctorial variations.

The bundles of collagen were well supplied with nuclei. The lymph spaces and the blood vessels were considerably dilated. The latter often contained serum. The walls of the vessels were thickened, the thickening being due to edema and to a proliferation of endothelium. There was a moderate infiltration, in the perivascular lymph spaces, composed of small round cells.

The foregoing evidences of inflammation were more conspicuous in the first than in the second biopsy, and may have been due partly, if not largely, to traumatism caused by the biopsy.

Clumps of extracellular pigment were found in the papillary layer and in the midcutis.

Appendages: A careful search of the serial sections of both biopsies failed to reveal sudoriparous glands or anlagen. Hair follicles were numerous, and many of them were of the lanugo type. The follicular orifices were dilated, and

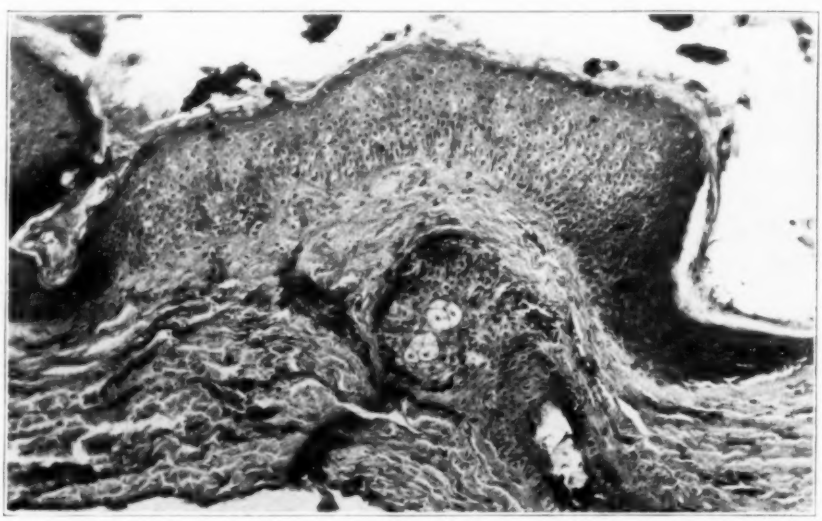

Fig. 10.—Moderate high-power photomicrograph of papule on the face. This section shows the papule between two follicular orifices. A portion of a follicle and sebaceous gland is in the center of the papule. The epidermis is moderately acanthotic in the papule. At the extreme right it is reduced to three or four layers of compressed cells. The follicular orifice to the left is filled with the thickened horny layer.

filled with the thickened horny layer. The sebaceous glands were numerous and large. Many of them were considerably degenerated and disorganized.

Elastic Tissue: Elastic tissue was sparingly distributed throughout the papillary layer; it was almost entirely absent in places, especially close to the epidermis. It was fairly abundant, but somewhat fragmented, in the reticular layer.

Genesis of the Papule: The papule appeared to be the result of acanthosis around dilated, hyperkeratotic follicular orifices, together with large, degenerated sebaceous glands situated close to the epidermis.

Tissue from the Forearm: Epidermis: The surface of the epidermis was undulating. The horny layer was moderately thickened, firmly adherent, and

free from nuclei. The granular layer was conspicuous and, for the most part, consisted of two layers of cells. With the exception of one area about to be described, the stratum mucosum was normal. The prickles could be detected only with difficulty. The basal layer was normal; some of the cells contained a little pigment. The rete pegs were small and not numerous.

In one area, there were moderate acanthosis and a papilliform formation similar to that encountered in verruca, verrucous nevus, ichthyosis hystrix, etc. Here the horny layer was considerably thickened, the papillae were long, narrow and pointed, and in one place, the basal layer was somewhat disorganized, and there was a slight infiltration of lymphocytes.

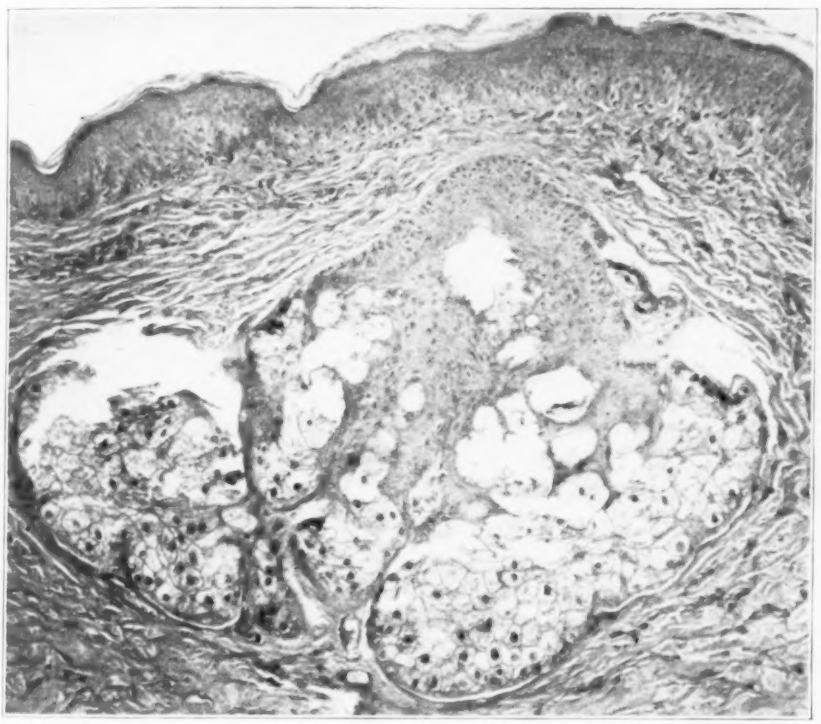

Fig. 11.—High-power photomicrograph of tissue from the face showing disorganization and degeneration of a sebaceous gland.

Derma: The blood vessels were moderately dilated, their walls were edematous, and there was a moderate perivascular infiltration of lymphocytes. A few of the dilated vessels were filled with serum.

For the most part, the collagen was normal; nuclei were abundant. There was a little edema in places; and there were areas in which the papillary layer, close to the epidermis, stained deeply with eosin.

Appendages: A search through all the serial sections failed to reveal the slightest evidence of sweat glands, sebaceous glands or hair follicles.

Elastic Tissue: Elastic tissue was reduced in amount in both the papillary and reticular layers. It was somewhat fragmented in places.

Summary of the Case Report.—Clinical: The patient never sweat. He was very uncomfortable during hot weather, due to elevation of blood temperature. This discomfort could be lessened by keeping the skin wet. His general health and mentality were excellent. There was no evidence of any chronic disease in the patient, nor in his family. No other member of the family showed physical defects. The basal metabolism was normal when at rest in a cool room.

The principal physical defects exhibited by the patient were: paucity of scalp hair; normal growth of hair on the face; very thin eyebrows; very few eyelashes; slight growth of hair in the axillae; good growth of pubic hair; all other parts of the body were devoid of hair, even of the lanugo type.

The supra-orbital ridges were large. The cheek bones were high and wide apart. There were numerous fine wrinkles on the eyelids and on the cheeks,

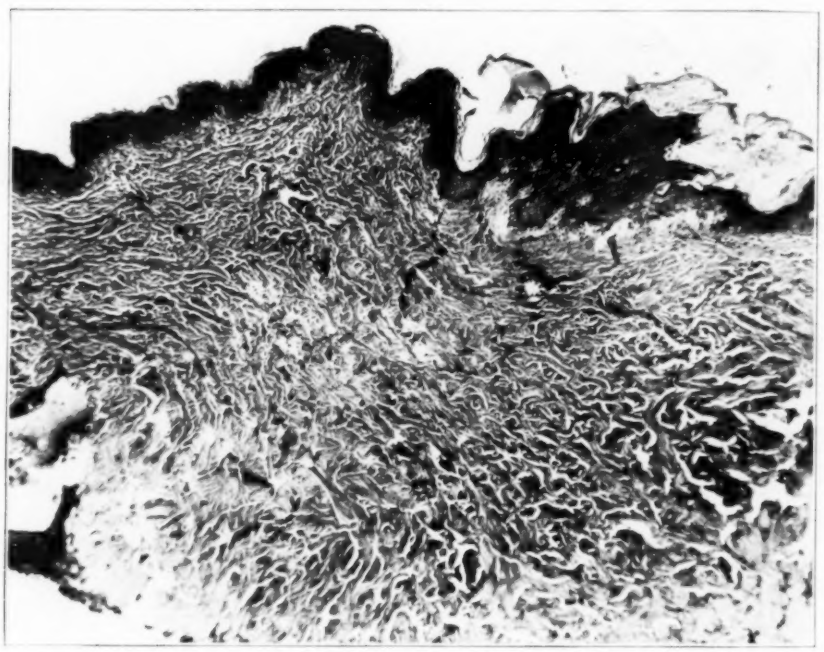

Fig. 12.—Low-power photomicrograph of tissue taken from the extensor surface of the left forearm. Note the total absence of appendages. In one place the epidermis is acanthotic, hyperkeratotic and papilliform.

near the nose. The eyes slanted upward. Pseudorhagades were present at the buccal commissures and near the nostrils. The lips were protrusive and their vermilion border was poorly defined. There were but six teeth, all of which were deformed. There was a saddle nose. The lobes of the ears were small and attached to the cheeks. There were numerous fawn-colored, pinhead-sized papules scattered over the face. There was hyperkeratosis of the palms and soles. The finger nails had free lateral margins. The skin of the entire body was thin and excessively dry.

Pathologic Histology: There was complete absence of coil glands. The hair follicles and sebaceous glands were absent in tissue from the forearm. They

were normal numerically in the tissue from the face, but the sebaceous glands were degenerated. There was a little inflammation and a little hyperkeratosis, especially in the follicular orifices, which were dilated. Elastic tissue was reduced in amount. The papule seemed to be due to a combination of acanthosis, dilated and hyperkeratotic follicular orifices and large, degenerated sebaceous glands situated close to the epidermis.

DISCUSSION OF CLINICAL AND PATHOLOGIC FEATURES

The accompanying tables supply as many of the principal clinical and histologic details of the recorded cases as could be obtained from the literature. The various authors failed to discuss all the features enumerated in the charts: there are, therefore, numerous blank spaces. Many of the characteristics of this interesting congenital affection deserve a more comprehensive presentation than is afforded by charts. We shall, therefore, discuss the salient points at some length.

Depressed Nasal Bridge.—The most characteristic details appear to be common to all of the patients. They all exhibit a depressed nasal bridge and prominent frontal bosses. In six instances, there was atrophic rhinitis which, in Geockermann's patient, was associated with evidence of ulceration, which was not modified by antisyphilitic treatment. Guilford does not mention this symptom, but in his patient the sense of smell was absent, and that of taste was impaired. In one of Wechselmann and Loewy's patients, both of these senses were absent. Christ reports impaired sense of smell. The interior of the nose and throat of our patient was normal, and there was no history of chronic rhinitis or coryza early in life. Christ and Strandberg believe that the nasal condition is ozena, and that it may represent a congenital malformation of the nasal mucosa.

Hypotrichosis.—True, congenital hypotrichosis is common to all the patients, the hairy parts being involved in various degrees. The principal point, in this connection, is that lanugo hair is absent from most of the body surface. In all instances, when glabrous skin has been studied microscopically (Goeckermann, Wechselmann and Loewy, Christ, Strandberg, Tendlau, and MacKee and Andrews), there is almost total absence of hair follicles and sebaceous glands. We found these structures in normal numbers in skin taken from the nasolabial fold. The sebaceous glands were normal in size, but many of them were considerably degenerated. Some of the follicular orifices were dilated and hyperkeratotic. The pilosebaceous system was absent in skin taken from the forearm. Wechselmann and Loewy found but one hair follicle and one sebaceous gland in 600 sections of skin from the axilla and thigh. The other authors failed to find a single gland or follicle.

Dental Aplasia.—A pronounced degree of dental aplasia was encountered in all instances. Our patient had five teeth, the largest

TABLE 2.—*Clinical Chart*

Clinical Features	Guilford, 1883	Tendlau, 1902	Wechselmann and Loewy, 1911		Christ, 1913	Strandberg, 1918	Goeckermann, 1920	MacKee and Andrews, 1924
Identification	P. W.	H. Z.	M. H.	W.	.....	P. S.	.....	C. R.
Age	48 years	48 years	.....	48 years	13 years	39 years	21 years	14 years
Sex	Male	Male	Male	Male	Male	Male	Female	Male
Race or nationality	U. S. A.	German	German	German	German	Swede	English	Jew
Number of brothers and sisters	21	.....	15	21	2	1	4	3
Number of brothers with ectodermal defects	None	.....	4; 3 died in infancy, 1 had probable major defect	None	1, probable major defect	None	.....	None
Ectodermal defects in antecedents	Maternal grandmother never had teeth or hair	None	None	Maternal uncle and grandmother never had teeth or hair	None	None	....	None
Diseases in antecedents	....	None	.....	.....	None	None	Syphilis (?), tuberculosis, insanity	None
Married or single	Married	Single	Single	Married	Single	Married	Single	Single
Number of children	8	.....	.....	8	.....	4	.....	.....
Number of children with ectodermal defects	2 with dental aplasia; others normal	.....	.....	3 with dental aplasia; others normal	.....	None	....	.....
Serious diseases	None	Smallpox, age 19; typhus, age 21; pulmonary tuberculosis, age 35	.....	None	None	None	None	None
Mentality	Good	Very inferior	Inferior	Normal	Inferior	Normal	Normal	Normal
Sweat	Never	Never	Never	Never	Never	Never	Never	Never
Suffers from heat	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Scalp hair	Downy, sparse	Sparse, fine, poorly pigmented	Sparse, silky	Sparse	Sparse	Sparse	Almost none	Sparse
Beard and mustache	Present	Normal	Present	Present	Present	Present	Absent	Normal
Eyebrows	Present	Absent	Absent	Present	Present	Few thin hairs	.....	Outer third absent; inner third sparse
Eyelashes	Present	Lanugo type	Present	Present	Present	Few on upper lids only	.....	Very few
Axillary hair	Normal	Normal	Sparse	Present	.....	Present	Almost absent	Sparse

Pubic hair	Normal	None on scrotum, otherwise normal	.....	Present	.....	Present; grows in female line	Almost none	Abundant; grows in female line
Lanugo hair on body	Absent	Absent	Absent	Sparse	Absent	Absent	Absent	Absent
Supra-orbital ridges	Prominent	Prominent	Prominent	Prominent	Prominent	Prominent	Prominent	Prominent
Saddle nose	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Chronic rhinitis	.....	Yes	Yes	Yes	Yes	Yes	Yes	No
Papular face lesions	.....	.....	Yes	.....	Yes	Yes	Yes	Yes
Pseudorhagades	.....	.....	.....	.....	.....	.....	.....	Yes
Sense of smell	Absent	.....	.....	Absent	Impaired	Normal	.....	Normal
Sense of taste	Impaired	.....	.....	Absent	Normal	Normal	.....	Normal
Mongolian facies	No	No	No	No	No	No	No	Yes
Deformed ears	.....	.....	Yes	.....	No	.....	.....	Yes
Lips	Thick, muscular	Thick, muscular	Thick, muscular	Thick, muscular	.....	Everted, large, thick	.....	Thick, muscular, protrusive
Vermilion border of lips	.....	.....	.....	.....	.....	.....	Poorly defined	Poorly defined
Number of teeth, upper jaw	None	4	4	None	2	None	Several	5
Number of teeth, lower jaw	None	None	None	None	None	None	None	1
Unerupted teeth shown by radiography	.....	.....	None	.....	None	None	.....	None
Deciduous teeth	None	.....	.....	None	2	None	.....	2
Deformed teeth	No teeth	.....	Yes	No teeth	Yes	No teeth	Yes	Yes
Palms	.....	Thin, slightly scaly	.....	.....	Normal	Normal	.....	Hyperkeratotic
Soles	.....	Normal	.....	.....	Normal	Normal	.....	Slightly hyperkeratotic
Finger nails	.....	Normal	Normal	Normal	Slightly deformed	Deformed	Longitudinal furrows	Free lateral edges
Toe nails	.....	Normal	Normal	Normal	Slightly deformed	Deformed	Longitudinal furrows	Normal
Genitals	.....	Normal	Normal	.....	Normal	Normal	.....	Normal
Mammae	Normal	Absent	Normal	Normal	Normal	Normal	Normal	Normal
Gross appearance of skin	Thin, white, dry, glossy, smooth, pliable	Thin, white, dry, glossy, smooth, pliable	Thin, white, dry, glossy, smooth, pliable	Thin, white, dry, glossy, smooth, pliable	Thin, white, dry, glossy, smooth, pliable	Thin, very white, glossy, smooth, dry, flexible	Thin, white, dry, glossy, smooth, pliable	Thin, white, dry, glossy, smooth, pliable
Musculature	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal
Wassermann test	.....	.....	Negative	.....	Negative	Negative	Negative	Negative

number thus far recorded. At the other extreme, Guilford's patient and Strandberg's patient were edentulous. Our patient had one tooth in the lower jaw. This is unusual; in all other patients the lower teeth were absent. In all instances, the teeth were deformed, the usual deformation consisting of a wide neck and pointed crown.

Gross Appearance of the Skin.—All the authors mention a dry, white, smooth, thin, pliable, glossy, somewhat transparent skin. The dryness is due, undoubtedly, to asteatosis and absence of sensible perspiration. In our patient, even the skin of the face was excessively dry, in spite of the presence of sebaceous glands. Here the dryness may be caused by absence of sweat glands, degenerated sebaceous glands and a sebum that may be defective in both quality and quantity. The glossy appearance probably was caused by the absence of lanugo hair. Several writers state that the follicular orifices can be seen in some places and not in others. As there are no follicles, except in a few locations, it is probable that this reference pertains to skin markings. The combined absence of follicular orifices and paucity of normal skin markings accounts for the smooth appearance noted by all the authors.

Strandberg reports a thin epidermis and absence of rete pegs. Christ mentions rudimentary papillae. We found elastic tissue reduced in amount, as also did Strandberg. Tendlau found the derma half as thick as usual. In other instances, the epidermis and derma were normal. In some cases, therefore, the clinical thinness and transparency may be caused by abnormalities of the epidermis or collagen. These clinical features may be due, also, to the absence of the appendages. It is possible that the conspicuously fair skin may be the result of hypotrichosis, together with paucity of normal skin markings and absence of appendages, rather than attenuated or anomalous pigmentation, although Strandberg reports a total absence of pigment in the basal cells.

Papular Lesions.—Papular lesions on the face, particularly near the nose, are mentioned by Wechselmann and Loewy, Christ, Goeckermann, and Strandberg, and they were very numerous in our patient. Wechselmann and Loewy, and Goeckermann made a clinical diagnosis of milium, while Christ was reminded of xeroderma pigmentosum. There were rhomboidal pigmentations, 2 mm. and 3 mm. in size, with lamellated scales, on the cheeks near the nose and eyes. There was also some telangiectasia. Strandberg reported a great number of rather solid, whitish yellow, hemp seed sized, warty excrescences, closely crowded, on the lips, chin and cheeks. He noticed that each papule had a centrally placed hair, and for this reason he believed that they were of pilosebaceous origin. In appearance, they suggested adenoma sebaceum. There was, also, a rosacea-like telangiectasia. The papules exhibited

by our patient resembled tiny sebaceous cysts or nevi; only a few suggested milium. Histologically, the lesions appeared to be the result of large, superficially placed, degenerated, sebaceous glands, together with hyperkeratotic, dilated, follicular orifices, and surrounding acanthosis.

Lips.—Goeckermann noted lessened definition of the vermilion border of the lips. This feature was present in our patient, but it was not mentioned by the other writers.

Guilford, Tendlau, Wechselmann and Loewy, and Strandberg call attention to thick, muscular lips. The unusual muscular development is caused by the additional labial activity required for mastication without teeth. Absence of teeth in early life leads to improper development of the jaws, as do faulty occlusion, mouth breathing, etc. In such instances, the lower part of the face is likely to be narrow, and the roof of the mouth convex; there may be more or less nasal deformity, and the lips are apt to be prominent. Our patient presented thick, protrusive lips, contracted dental arches, markedly convex hard palate, nasal deformity, and the lower part of his face was narrow. This narrowness of the lower half of the face was not mentioned by the other authors, but the front-face photographs published by Goeckermann, and Wechselmann and Loewy exhibit this feature.

Nails.—Christ does not describe the nails, but states that the nails of both the fingers and toes were deformed. The nails of the fingers and toes in Strandberg's patient were large and hooked over the ends of the digits like the bill of a parrot. Goeckermann records longitudinal furrows of the finger nails and toe nails. The finger nails of our patient depicted flat, free, lateral margins. The toe nails were normal. Guilford does not mention the nails. In all other instances, the nails were normal.

Mentality.—An inferior mentality was noted by Tendlau. One of Wechselmann and Loewy's patients showed low intelligence, while their other patient was normal in this respect, as also were Guilford's patient and Strandberg's patient. Christ's patient exhibited inferior mentality. Goeckermann's patient and our patient possessed mental acuity that was somewhat above the average. Incidentally, the brain is of epiblastic orgin; the central nervous system is well differentiated into brain and spinal cord, in human embryos, by the sixth week (Prentice and Arey [24]).

Sweat Glands.—As Goeckermann states, the total absence of sudoriparous glands is one of the most distinguishing and most interesting features of this group of ectodermal defect. Goeckermann,

24. Prentice, C. M., and Arey, L. B.: Text Book of Embryology, Philadelphia, W. B. Saunders Company, 1921.

Tendlau, Christ, Wechselmann and Loewy, and Strandberg, all of whom made histologic examinations, failed to find sweat glands or anlagen. We failed to find a single sweat gland in serial sections made from three biopsies from the face and forearm. None of the recorded patients ever had sensible perspiration; it may be assumed, therefore, that the sudoriparous system is absent in all cases. The fact that anlagen and degenerated remnants of coil glands and ducts have not been detected implies an arrest of development in early embryonic life. According to Prentice and Arey, the sweat glands appear first on the palms, soles and face during the fourth month.

Subjective Symptoms.—These patients are unable to tolerate heat. On a hot day, or when in a hot room, they complain of feverishness, palpitation, shortness of breath, lassitude, headache, vertigo, etc. Exercise enhances these symptoms to the point of prostration. Even the ingestion of hot food or drink may produce considerable discomfort. The patients are comfortable and healthy in a cool atmosphere, and under such conditions they can tolerate considerable physical exertion. Our patient attends school regularly and, to a slight extent, plays baseball in the spring. He avoids the sun and hot food, and remains comparatively inactive, physically, on hot days. In very hot weather he dampens his underclothing with water. Goeckermann's patient, a stenographer, followed her occupation throughout the year without distress, because she worked in a cool place and was not active physically.

Guilford's patient worked on a farm in the summer. It was necessary, while working in the field on hot days, to engage a boy to carry water from a neighboring brook with which he kept his clothes wet. If the clothing became dry, he collapsed from the heat. Similar stories are related by all the patients. They find it necessary to avoid heat, vigorous physical exercise, hot food and drink, especially in warm weather, and often they are compelled to resort to "artificial perspiration" by keeping their clothes wet with water.

Origin and Function of Perspiration.—Total absence of sweat glands in a human being offers unusual opportunities for the study of cutaneous physiology—especially the production and function of sensible and insensible perspiration.

Most physicians, and until recent times, most physiologists, have regarded the skin as an excretory and even a "respiratory" organ. By diffusion of gases and elimination of the waste products of metabolism by the sweat glands, the skin was supposed to assume vicariously the function of the kidneys and to some extent that of the lungs. This opinion followed the demonstration of increased quantities of urea in the sweat of uremic persons, and the discovery that a person soon dies if the entire body is covered with an impenetrable, nonconducting sub-

stance. It appears to be the consensus of opinion among modern physiologists that the skin is of little value as an excretory organ, but that it is an essential heat regulator.

Plaggemeyer and Marshall [25] and Adolph [26] have shown that while the sweat may simulate the urine qualitatively, the amount of waste metabolic products in the sweat is comparatively slight. The sudoriparous glands are not very responsive to chemical changes in the blood, as are the kidneys; they are unable to excrete waste products in concentration; in fact, sweat is a fairly uniform secretion in which concentration of chemical substances is low. As Adolph remarks, the kidneys are concerned with the conservation of water, while the sweat glands are concerned with the production of a copious, dilute fluid that evaporates readily. Adolph summarizes his interesting article as herewith appended:

1. The composition of sweat from the human body varies with the region and with the duration of sweating. It does not vary with the atmospheric conditions. Slight variations in its reaction and chlorid concentration were found to correlate simultaneously with changes in the blood.

2. While the composition of the sweat is correlated slightly with that of the blood, the product elaborated by the sweat glands seems to be primarily independent of chemical conditions in the body. The sweat glands are, therefore, comparable to the salivary and mammary glands in their work of producing a uniform secretion. This secretion is more dilute than the blood in respect to its dissolved substances.

3. The compensating activities of the kidneys, which correlate their work with that of the sweat glands, is a correlation only on the part of the kidneys, since the kidneys are accustomed to correct the variations in the blood's composition.

Vierodt,[27] quoted by Howell, estimates that in man the skin eliminates, by radiation, conduction and evaporation, 87.5 per cent. of the heat thrown off by the body. This is compared with 1.8 per cent. for the urine and feces, and 10.7 per cent. for the lungs (warming of air and vaporization of water).

The belief that the principal function of perspiration (sensible and insensible) is to regulate or help regulate the heat of the body, is considerably strengthened by a study of the class of ectrodermal defect under consideration. These patients are healthy and live to a normal age, and, with the exception of the sweat and sebum, the excretions are

25. Plaggemeyer, H. W., and Marshall, E. K., Jr.: A Comparison of the Excretory Power of the Skin with That of the Kidney Through a Study of Human Sweat, Arch. Int. Med. **13**:159 (Jan.) 1914.

26. Adolph, E. F.: Am. J. Physiol. **66**:445 (Nov.) 1923.

27. Vierodt, quoted by Howell: Textbook of Physiology, Ed. 5, Philadelphia, W. B. Saunders Company, 1913, p. 933.

normal. The sole inadequate, physiologic function is the failure to radiate sufficient heat when subjected to a hot atmosphere or to vigorous physical exercise.

Tendlau, and Wechselmann and Loewy made a number of interesting observations in an attempt to determine the function of insensible and sensible perspiration. Tendlau observed a rise of temperature of 1.3 degrees after drinking a pint of milk at 104 F. When exposed to the sun on a hot day, the patient's temperature rose 3.7 degrees in twenty minutes. The highest temperature recorded was 105.4 F. When exposed to hot, dry air, the temperature of our patient rose to 101 F. in half an hour. His rectal temperature rose from 99 to 99.4 F. in seventeen minutes after drinking two cups of hot water, and it remained about 99.4 F. nearly an hour. Tendlau, and Wechselmann and Loewy call attention to respiratory acceleration when the patient is exposed to heat and to an increased respiratory rate and volume at all times. This may be interpreted as an attempt by the lungs to assume vicariously the heat regulating function of the skin, which however, is unsuccessful in man.

Loewy and Wechselmann, under conditions suitable for insensible perspiration, compared the elimination of water by normal persons and by persons without sweat glands. In a given length of time, the maximum amount of water eliminated by two patients without sweat glands was 436 gm. and 600 gm., respectively. The minimum elimination was 123 gm. and 242 gm. The average maximum for five normal persons was 700 gm.; the average minimum, 112 gm.

The results of the basal metabolism test in our patient support the foregoing observations. This test demonstrates that the skin of the patient, even without sweat glands, eliminates enough water to fulfil the requirements of the individual when at rest under ordinary environmental conditions. The sweat glands, therefore, constitute an emergency apparatus, which is called on to regulate the body heat only under the stress of exercise, hot weather, etc.

The foregoing paragraphs convince one that a person with total absence of sweat glands eliminates a normal amount of water through the skin when at rest in a cool atmosphere; and they suggest that this water constitutes insensible perspiration; that insensible perspiration is not a secretion from the coil glands; that sweat is a secretion from the sudoriparous glands; that insensible perspiration is a necessity; that sensible perspiration is an important emergency secretion; that the principal function of perspiration is to regulate the body heat.

Absorption by the Skin.—Tendlau applied potassium iodid ointment to the part of the body of his patient that was devoid of appendages. This chemical was selected because it is easily detectable in the urine,

and because absorption by inhalation is thought not to occur. When the ointment was applied for several hours without friction there was no absorption. When it was rubbed into the skin thoroughly, the chemical was detected in the urine in the usual length of time. The experiment would seem to prove that potassium iodid, in a fatty medium, is absorbed by the skin. It certainly shows that hair follicles, sebaceous glands and sweat glands are not necessary for such absorption.

Unusual Clinical Features.—Goeckermann's patient represents the only case of the major type of ectodermal defect in a female thus far recorded. The sense of smell was reported absent by Guilford, and Wechselmann and Loewy, and impaired, by Christ. The sense of taste was impaired in Guilford's patient, and absent in one of Wechselmann and Loewy's patients. The mammae were reported absent by Tendlau. The unusual clinical features presented by our patient are: the radiating, linear defects at the oral commissures and near the nostrils; the fine wrinkles of the skin of the face, especially on and near the eyelids, mentioned, also, by Christ; mongolian facies; a rather effeminate voice (the voice of Strandberg's patient was thick and indistinct); the large number of papular lesions on the face; deformation of the ears, also noted by Wechselmann and Loewy; the lack of definition of the vermilion borders of the lips, also reported by Goeckermann, and deformation of nails, also recorded by Goeckermann and Strandberg; one lower tooth; hyperkeratosis of the soles, but particularly of the palms, noted, also, by Tendlau. Virchow, quoted by Wechselmann and Loewy, considered the head of Tendlau's patient to be of the hypsobrachycephalic type.

ETIOLOGY

Heredity.—One of Wechselmann and Loewy's patients, who was one of fifteen children, had four brothers who exhibited cutaneous anomalies. Three of these children died in infancy. The one who survived is said to have exhibited the major type of ectodermal defect. All the other children and the antecedents, were normal. Their other patient belonged to a family of twenty-one children, all of whom were normal. This patient had a maternal grandmother and uncle who presented congenital absence of hair and teeth. Christ's patient, who was one of three children, had one brother who was afflicted with a probable major ectodermal defect. The other child, a sister, was normal. The antecedents were normal. Guilford's patient had twenty-one brothers and sisters, all of whom were normal. The maternal grandmother of this patient exhibited congenital absence of teeth and hair. Goeckermann was unable to obtain a reliable family history. A negative family history was reported by Tendlau and Strandberg. Careful questioning failed to reveal a pertinent family tree in our case.

Ascher, quoted by Wechselmann and Loewy, compiled and investigated the family trees presented by Tendlau's patient and by Wechselmann and Loewy's patients. He is of the opinion that the defect is recessive in the female; but one of the female antecedents reported by Wechselmann and Loewy was defective, and Guilford reports a similar instance. More important, however, is the fact that Goeckermann's patient, who represents a typical example of major ectodermal defect, is a woman.

Three of the patients afflicted with this type of ectodermal defect were married. Guilford's patient had eight children, two of whom had only half the correct number of teeth; otherwise they were normal. All the other children were normal. One of Wechselmann and Loewy's patients also had eight children, in three of whom many of the teeth were absent. Strandberg's patient had four normal children.

Syphilis.—Goeckermann elicited an indefinite family history of syphilis. There was also a history of tuberculosis and insanity in the family. The patient, however, was healthy, and her Wassermann reaction was negative. Christ thought that his patient had syphilis simply because of the ectodermal defect. The Wassermann reaction was negative. Tendlau's patient had pulmonary tuberculosis, but the family history was negative.

In the past it was customary to blame syphilis or tuberculosis, especially the former, directly or indirectly, for many of the congenital defects and affections. Suffice it to say, here, that syphilis is now regarded as acquired and congenital; not hereditary. However, there are many who believe that mythical syphilitic pathology in an antecedent, especially affecting the ductless glands, may result in developmental faults in the progeny.

Guilford and Strandberg call attention to the fact that the teeth and hair follicles begin to develop in the third month, as invaginations from the epiderm, which explains why dental aplasia and atrichosis are so often associated. Prentice and Arey state that the hair on the scalp, face and eyebrows appears about the second month; the body lanugo hair develops during the fourth month; the teeth begin by ectrodermal invaginations to form the enamel during the sixth or eighth week; the sebaceous glands appear coincidentally with the hair. As pointed out by Goeckermann, if syphilis were the etiologic factor, it would be necessary to assume its sudden activation and recession during the third or fourth month of intra-uterine life.

We were unable to elicit a history of syphilis or of any other chronic affection in the family of our patient. The Wassermann reaction for the mother, the patient and one brother was negative. With the exception of the ectodermal defects, our patient exhibited nothing that was remotely suggestive of syphilis.

The depressed nasal bridge, which resembles the saddle nose of syphilis, is a conspicious characteristic of major ectodermal defect. Most of these patients have atrophic rhinitis, which might influence some to suspect syphilis as the cause of the saddle nose. The syphilitic saddle nose is not the result of specific coryza or rhinitis; it implies gummatous involvement of bone; and in none of these patients is there such a history. As previously mentioned, the nose, with the exception of the depressed bridge, and the throat of our patient were normal, and there was no history of "snuffles" or of any form of nasal disorder in infancy or childhood.

The dental aplasia, which is another characteristic of this type of ectodermal defect, is not typical or even strongly suggestive of syphilis. Hutchinson's teeth, absence of some or many teeth, and other dental deformities are encountered in congenital syphilis, but such patients usually give a history of, or show evidence of, active syphilis. Absence of teeth, in addition to causing the deformities enumerated under the heading of "lips" in this discussion, may be an indirect factor in the production of the saddle nose.

The radiating, linear defects situated at the oral commissures and near the nostrils of our patient, are suggestive of scars subsequent to syphilitic rhagades. Such scars, however, are seldom encountered near the nostrils; and, on close inspection, the anomaly has the appearance of atrophy, or of a congenital defect, rather than of scar tissue.

It is noteworthy that not a single one of these patients with major ectodermal defect gives a positive Wassermann reaction, and in not a single instance is there a symptom or malformation that is definitely syphilitic.

There is no convincing reason why syphilis or tuberculosis should be evoked in explanation of the underlying cause for this widespread ectodermal defect. About all that one can say, without entering into the realm of speculation, is that this affection is familial; that the patients and their antecedents, for the most part, appear to be free from serious diseases; that there is no history of consanguinity; and that, at the present moment, physiology, embryology, anthropology, eugenics, endocrinology or any other branch of science fails to provide a nonspeculative cause for this and for many other congenital and hereditary anomalies of development.

CONCLUSIONS

1. There is a record of eight bona fide patients who present a fairly universal congenital ectodermal aplasia. They all exhibit the same clinical characteristics, and they comprise a distinct group of congenital ectodermal defect.

2. As there are but ten recorded cases belonging to this group, only eight of which have been described, the affection may be regarded as rare, at least until a larger number of patients are recorded.

3. The principal clinical characteristics of this group are: congenital absence of sweat glands; absence of pilosebaceous apparatus over most of the body; marked dental aplasia; depressed nasal bridge; atrophic rhinitis; prominent supra-orbital ridges; thick, protrusive lips;

TABLE 3.—*Histologic Chart*

Histologic Features	Tendlau	Wechselmann and Loewy	Christ	Strandberg	Goeckermann	MacKee and Andrews
Location of biopsy	Forearm	2 biopsies, axilla and thigh, serial sections	Inner surface of forearm	Forearm	External surface of left arm, serial sections	3 biopsies: 2 on left cheek near nose, 1 on outer surface of left forearm
Sweat glands....	Absent	Absent	Absent	Absent	Absent	Absent
Hair follicles and arrectores	Absent	One hair follicle found in 600 sections	Absent	Absent	Absent	Abundant on face, many are of lanugo type; orifices of many are dilated and hyperkeratotic; absent on arm
Sebaceous glands	Absent	One sebaceous gland found in 600 sections	Absent	Absent	Absent	Abundant on face; many show considerable degeneration; absent on arm
Epidermis.....	.....	Practically normal	.....	Very thin over large areas; many basal cells devoid of pigment; horny layer thin	Normal	Acanthotic in places; very thin and compressed in places; moderate hyperkeratosis; pegs small and not numerous
Derma.....	Only half as thick as normal; moderate inflammation	Practically normal	Papillae rudimentary and few in number; slight inflammation	Very few small papillae; vessels perhaps reduced numerically	Normal	Moderate inflammation
Elastica.....	.....	.....	.....	Absent close to epidermis, otherwise normal	.....	Reduced in amount especially in papillary layer; absent in places; somewhat fragmented

thin, glossy, smooth, dry skin; papular lesions on the face; heat intolerance.

4. The detailed description of a new patient is presented, who, in addition to possessing all the clinical characteristics of the group, exhibits: a mongolian facies; deformed ears; fine wrinkles of the eyelids and environs; radiating, linear defects at the oral commissures and near the nostrils; aplasia of the nails; narrow lower half of face; unusually large number of papules on the face; absence of atrophic rhinitis.

5. The affection is familial. All but one patient are males. Most of the patients and their ancestors appear to be free from syphilis and tuberculosis. The cause of the developmental defect is unknown. Arrest of development occurs very early in intra-uterine life.

6. The absence of sweat glands offers an unusual opportunity to study the physiology of perspiration. Experiments and observations thus far made, show that insensible perspiration is probably independent of the sudoriparous glands; that the principal function of perspiration is to regulate the body heat; that the sweat glands constitute an emergency apparatus for this purpose; that patients without sweat glands are handicapped through inability to radiate sufficient heat under certain environmental conditions, but they are healthy and active, and longevity is apparently unaffected.

DISCUSSION

Dr. W. H. D. Goeckermann, Rochester, Minn.: I saw this case with Dr. Andrews and it showed all the cardinal findings of this group. I recently had my attention called forcibly to the true hereditary character of this anomaly. Thadani of India has had occasion to observe many of these cases. It seems that in some tribes there this defect develops frequently. Thadani showed that the inheritance in these cases followed the mendelian law. In his group, the defect is transmitted through the female to the male. The male who is affected will not transmit the defect, but even an apparently healthy female will transmit the disease to the male offspring. Our case of some years ago, then, would be a freak. Just how to explain it we do not know, as we found no history in any of the ancestors. Recently, we had a second case in a male, which showed the same striking characteristics. The patient had lived all his life in Illinois. A maternal uncle and two maternal great uncles had the defect. It would seem then, that the defect is not excessively rare. I believe it is not recognized in many instances. In this case, a number of physicians evidently wished to make a diagnosis of leprosy. The condition is not so striking that it would be recognized casually on the street. The young man we saw looked strong and functioned as a guard at a swimming station very effectively. This was in accord with his comfort, for he could remain almost constantly in water. Davenport of the Carnegie Institute called my attention to the similarity of some of these cases to mongolian idiocy. I have carefully searched the literature, however, and do not believe that that is correct. The literature, and such cases as I have observed, will not bear out Davenport's opinion. These cases, while not frequent, are not so rare but that we should get them from time to time.

Dr. George C. Andrews, New York: Only one case was suspected of being syphilis, and that was purely on the old grounds of what could not be understood very well being relegated to parasyphilitic or syphilitic condition. Our patient gave a negative Wassermann reaction on the blood and spinal fluid, there was no family history, and his mother's and brother's Wassermann reactions were also negative. Some of these patients have a mental deficiency, as might be expected in an ectodermal defect, but the brain separates long before the defect occurs and that probably accounts for the lack of mental deficiency in most of these cases.

EXPERIMENTAL ACNE VARIOLIFORMIS *

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The acne varioliformis referred to in this study is that of the Hebra, i. e., the more widespread, deep-seated, indurative form followed by varioliform scars. Case 1 was of the extreme type, both as to distribution and character of lesion. Case 2 was more limited. However, common to both cases were the indurative, woody edema, hemorrhagic deep necroses and correspondingly deep varioliform scarring that are not seen in the acne necrotica of Boeck. Our experiments were confined to reproduction of the lesions, but nothing was done to ascertain their distribution. The lesions were produced both in guinea-pigs and in the patient himself with the streptococcus associated with the staphylococcus. I believe that the streptococcus is to be looked on as the agent that caused the distinctive features of the lesion in the two cases reported.

REPORT OF CASES

Case 1.—Nicholas F., a youth, aged 18, white, of Italian parentage, was well until the age of 5, when he was vaccinated against smallpox, together with his sister, who was three years younger. Immediately after vaccination both the patient and the sister developed pustular eruption limited to the arms and legs. The sister improved rapidly under treatment, but the condition has persisted on the patient. According to the patient, the lesions were similar to those exhibited at present.

At the age of 10, the disease extended to the back; from the back it spread to the neck, face and scalp. The extension apparently followed an attack of dermatitis due to some kind of grass. At the age of 15, the lesions spread thickly over the thighs; again about this time the patient had an attack of "ivy poison," which cleared entirely in a few days. He had an attack of acute appendicitis at 12 years of age, but was not operated on. He had influenza in 1918, and three or four years before presentation was treated for bronchitis. The patient had always had a cough, more in the winter, with slight expectoration. He has always perspired freely, and complained of palpitation on slight provocation, and of rise in temperature, particularly in the afternoon. A phlyctenular keratitis developed in the right eye.

The patient was admitted to the University Hospital in the service of Dr. Fred D. Weidman, September, 1923.

Examination.—Large numbers of active lesions were found distributed over all regions of the body, the scalp, hands, forearms and feet being the only regions free. While the foregoing parts were free from active lesions, they showed, together with the rest of the body, numerous discoidal scars, which will be described later.

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The most recent lesions appeared as deep-seated, nodular infiltrations, 4 or 5 mm. in diameter, over which the skin was red and elevated. At the next stage, the surrounding parts had become more infiltrated and edematous. Other lesions, representing the following stage, exhibited central necrosis and hemorrhage, while a woody edema appeared peripherally. The next lesion in order of development was the ulcer, in which the central core had more or less sloughed out, leaving an ulcer with hard, sanious, steep margins and a hemorrhagic base. Around this there was a broad hemorrhagic areola of woody edematous character. Such ulcers produced little pus, and were mostly covered by a dark crust. There were a number of healing lesions in all stages, and new lesions were sometimes found in the old scars. Scars were numerous, generalized like the acute lesions and measuring from 5 to 20 mm. and more in diameter. Some were soft and flush with the surface of the skin, while others were depressed, and the overlying skin was atrophic. Some of the latter had a sharp ringlike margin under which the finger could be pressed. Others were hypertrophic and strongly elevated above the general level of the skin, yet they were not keloidal, but soft and cushion-like. Over the face and upper part of the trunk they were definitely varioliform. The lesions had no relation to the hair follicles.

Of a quite different type were certain other lesions. These consisted of superficial yellow pustules not more than 1 or 2 mm. in diameter, scattered over the body. A small drop of pus could be expressed; these lesions dried out in a few days without leaving a scar, and were usually formed around some of the main lesions.

The right cornea showed scars of phlychtenular keratitis. Polyadenopathy was marked. Internal examination for focal infections by specialists of the hospital staff revealed nothing but a moderate tachycardia, probably of toxic origin.

The patient was presented at the October meeting of the Dermatological Society of Philadelphia, and the diagnosis of acne varioliformis was generally concurred in. He had also attended three New York clinics, in one of which tuberculosis of the skin was diagnosed; in an eye clinic, phlyctenular keratitis was diagnosed.

Clinical Analysis.—We have a generalized furuncular dermatitis dating from babyhood. The distribution is that of acne vulgaris, with the addition of scalp involvement and phlyctenular keratitis. The phase which has attracted us most is the individual lesion, which stands out because it is so deep-seated, has a central core (slough) and is surrounded by woody edema. The latter reflects the traits of streptococcus. The depth of the furuncles accounts for the varioliform qualities of the scars. The lesions were not keratotic.

Laboratory Examination.—The urinalysis and the blood Wassermann test were negative. Blood cultures were negative on three different occasions. The blood count was: hemoglobin, 94 per cent.; red blood cells, 4,840,000; white blood cells, 8,000; differential count; polymorphonuclear neutrophils, 67 per cent.; polymorphonuclear eosinophils, 2 per cent.; mast leukocytes, 1 per cent.; lymphocytes, 26 per cent.; monocytes, 4 per cent. The platelets were normal in number. There were no morphologic alterations of erythrocytes.

Histologic Examination.—Four lesions were excised, ranging from the earliest to the ulcerated form. In none was there the slightest hint of tuberculous architecture. The tissue changes were not per se distinctive, and brought out

nothing other than might have been expected from the gross examination, except the basis of the woody edema. Thus, the central necrosis with surrounding infiltration of inflammatory cells and fluid were expressed according to rule, but in the woody edematous parts the exudate was expressed not by fibrin as was expected, but by the finely granular pink precipitate of serum albumins and globulins. The other moiety, i. e., the indurative, woody quality was afforded by slender white fibrous fibrillae which appeared to be split from the parent bundle and which lay more or less isolated within the edematous material. We have thus explained a certain keloidal (but soft) character of the early scars. Bacteria were found in sections stained with Giemsa stain, both in the superficial portion, as well as in the deep infiltrated tissues. On the slough as well as in the superficial portion, the large cocci, sometimes in conspicuous numbers, prevailed; while in the tissues surrounding the central necrosis, a much smaller coccus was found—usually isolated, sometimes in chains of from two to four. These were especially numerous between the edematous connective tissue fibrillae of the rete.

Smears of pus from the recent nonulcerated lesions showed large numbers of small cocci, often in very short chains, and a few large staphylococci and many red blood cells in addition to the usual pus elements. Smears from older lesions showed fewer small cocci and more staphylococci. Smears from the superficial yellow pustules showed only staphylococci in almost pure culture. Neither tubercle bacilli, mycelial elements nor yeast bodies were found in smears.

CULTURES

Cultures on blood agar plates and in glucose bouillon were made from the following sources. Sugar fermentation tests were made to determine species.

Culture material was taken from nasal secretion, crypts of the tonsils, fluid from a new lesion, pus from an old, open lesion, and pus from a small, superficial yellow pustule.

In the nose and throat cultures there were a few typical colonies of *Staphylococcus pyogenes-aureus hemolyticus*, and many colonies of a small, short chained hemolytic streptococcus. From the throat cultures, influenza bacillua colonies were also obtained. Many colonies of *Streptococcus pyogenes-hemolyticus* and a few of *Staphylococcus pyogenes-aureus hemolyticus* were found in cultures from a new lesion. A few colonies of *Streptococcus pyogenes-hemolyticus* and many colonies of *Staphylococcus pyogenes-aureus* were found in cultures from an old lesion. *Staphylococcus aureus-hemolyticus* in pure culture were found in cultures from small, superficial yellow pustules.

Cultures in conservation and glucose agar (proof medium) did not show any fungi or yeast growth.

The bacterial cultures described in the foregoing were repeated a number of times from different lesions and constantly gave the same results.

Identity of the Bacterial Species.—According to Bergey's system, the streptococcus from both Case 1 and Case 2 falls in the position—

Streptococcus pyogenes of Rosenbach;[1] the staphylococcus was the "aureus" whose characters are described on page 54 of the same manual.

ANIMAL EXPERIMENTATION

Guinea-Pig Inoculations.—Fragments of skin from an old lesion were injected subcutaneously and intraperitoneally into two guinea-pigs, first crushing the regional lymph node. No evidence of tuberculosis, macroscopically or microscopically was found at the necropsy, which was performed forty days after injection.

Experimntal Lesions.—Animal 1, a young guinea-pig, received injections of fresh pus from a fresh lesion under the skin of the thighs. This gave rise in twenty-four hours to a localized hemorrhagic infiltration. The infiltration increased for three or four days; the central part softened, and in about a week the lesion opened in the form of a deep, necrotic, hemorrhagic ulcer, which soon was covered by thick, adherent, dark, necrotic crust. From this lesion, *Streptococcus pyogenes-hemolyticus* and *Staphylococcus pyogenes-aureus hemolyticus* were obtained in smears and cultures. The ulcer developed slowly to the formation of an atrophic scar in about one month.

In animal 2, fluid from a recent lesion was injected under the skin of the left thigh, while that from an old lesion was given under the skin of the right thigh. In the left thigh, a lesion developed almost similar to that of Animal 1; the injection on the right thigh gave rise to a localized infiltration, which cleared in a few days without leaving any trace. Bacterial cultures were also injected—this time into the back of the same animal. This consisted of 0.25 c.c. of an eighteen hour culture of streptococcus isolated from the patient, and 0.25 c.c. of a similarly isolated staphylococcus culture. This gave rise in twenty-four hours to a localized hard infiltration, which enlarged for three days; and on the fourth day, the center softened, and on the seventh, there was a deep ulceration covered by a thick crust, with raised infiltrated hemorrhagic borders. On the ninth day, the crust fell off, leaving a deep-seated round ulcer measuring 15 mm. in diameter; this healed slowly in about twenty days, leaving a deep atrophic scar which persisted until two months later. Hairs were permanently lost from this site. Cultures from the lesions on the back showed streptococcus and staphylococcus. The same animal received further injections on the left side of the back with 0.5 c.c. of eighteen hour old broth culture of *Staphylococcus aureus*. The injection was followed by localized infiltration, which on the fourth day after injection gave rise to a typical abscess formation, which opened spontaneously on the fifth day, with evacuation of yellow pus and superficial ulceration soon covered by a thick crust. The ulcer healed in ten days, with no scarring. Only *Staphylococcus aureus* in pure culture was obtained.

The same results were obtained with another guinea-pig that received injections in the same manner, and which was used as a control, with the difference that 0.5 c.c. instead of 0.25 c.c. of each culture was used, and consequently a larger lesion was obtained; there was practically no difference in the time of development of the lesions in these two guinea-pigs.

1. In the light of serologic tests, this was claimed as Type 1 of the hemolytic group of streptococci (Bergey: Manual of Determinative Bacteriology 1923. pp. 47 and 48).

Animals 3 and 4.—Four injections were made into the back of each animal as follows: Left upper, 0.12 c.c. of eighteen hour broth culture of streptococcus; left lower, 0.12 c.c. of eighteen hour broth culture of staphylococcus; right upper and right lower, 0.12 c.c. of mixed staphylococcus and streptococcus culture. The cultures employed for this test were not the ones isolated from the patient in Case 1, but cultures of the same varieties freshly isolated from other patients.[2]

At the purely streptococci sites there appeared at the end of forty-eight hours a slight infiltration which almost disappeared by the end of the week. The injection of the staphylococcus alone gave rise to a localized infiltration with abscess formation and discharge of pus on the sixth day. On the tenth day, the lesion was a small, superficial ulceration about 6 mm. in diameter, covered by a thin crust which fell off in eighteen days, leaving a smooth scar soon covered by hair. At the two sites of mixed injection, a localized infiltration appeared on the third day slowly increasing up to the eighth day, when softening of the central part occurred. On the twelfth day, the surface became necrotic, with a thick, strongly adherent, hemorrhagic slough underneath, in appearance resembling a crust. The diameter of the lesion was 12 mm. From both lesions, streptococcus and staphylococcus of the types mentioned above were obtained.

The crust and the slough were evacuated by the fifteenth day, leaving a rather deep-seated ulceration with elevated and intensely hemorrhagic borders. Healing was complete in one month, leaving a smooth thin scar.

Animals 5 and 6.—These two guinea-pigs also received injections with cultures isolated from the patient, and the animals were closely followed for a number of months.

Guinea-pig 5 received injections in the back as follows: Upper right and left with 0.5 c.c. of streptococcus and 0.5 c.c. of staphylococcus; lower left, 0.5 c.c. of staphylococcus; and at the lower right part, 0.5 c.c. of streptococcus culture. The course of events was as follows: After twenty-four hours, there was a slight erythema at the two upper (mixed cultures) sites. At forty-eight hours, there was an induration in addition, and at this time erythema had appeared at the lower sites of injection. The progress of the two lesions from this time on was very different. The lower right lesion (streptococcus only) attained its greatest development on the fourth and fifth days, and subsided on the tenth, leaving no scar. The lower left lesion (staphylococcus only) developed into a creamy pus-discharging abscess by the seventh day, and by the fifteenth had dried up leaving only a little crust. At the end of a month, only a smooth pink scar remained. Returning to the two upper lesions (mixed streptococcus and staphylococcus), a hemorrhagic swelling developed over a large zone, which sloughed on the eighth day, and by the tenth day had produced a deep hemorrhagic ulcer with elevated margins of the type which has already been described (Fig. 2). At fifteen days, the appearance was unchanged, although the two lower lesions had by this time practically disappeared. At the end of the month, the upper lesions were still ulcerative, and a few small

2. A stock culture of *Streptococcus pyogenes-hemolyticus*, that had been preserved in culture for a number of months by Dr. Julianelle, and *Staphylococcus pyogenes aureus hemolyticus* freshly isolated from an extensive abscess of the leg were used. A guinea-pig injected with 1 c.c. of each of the two preceding cultures died in forty-eight hours.

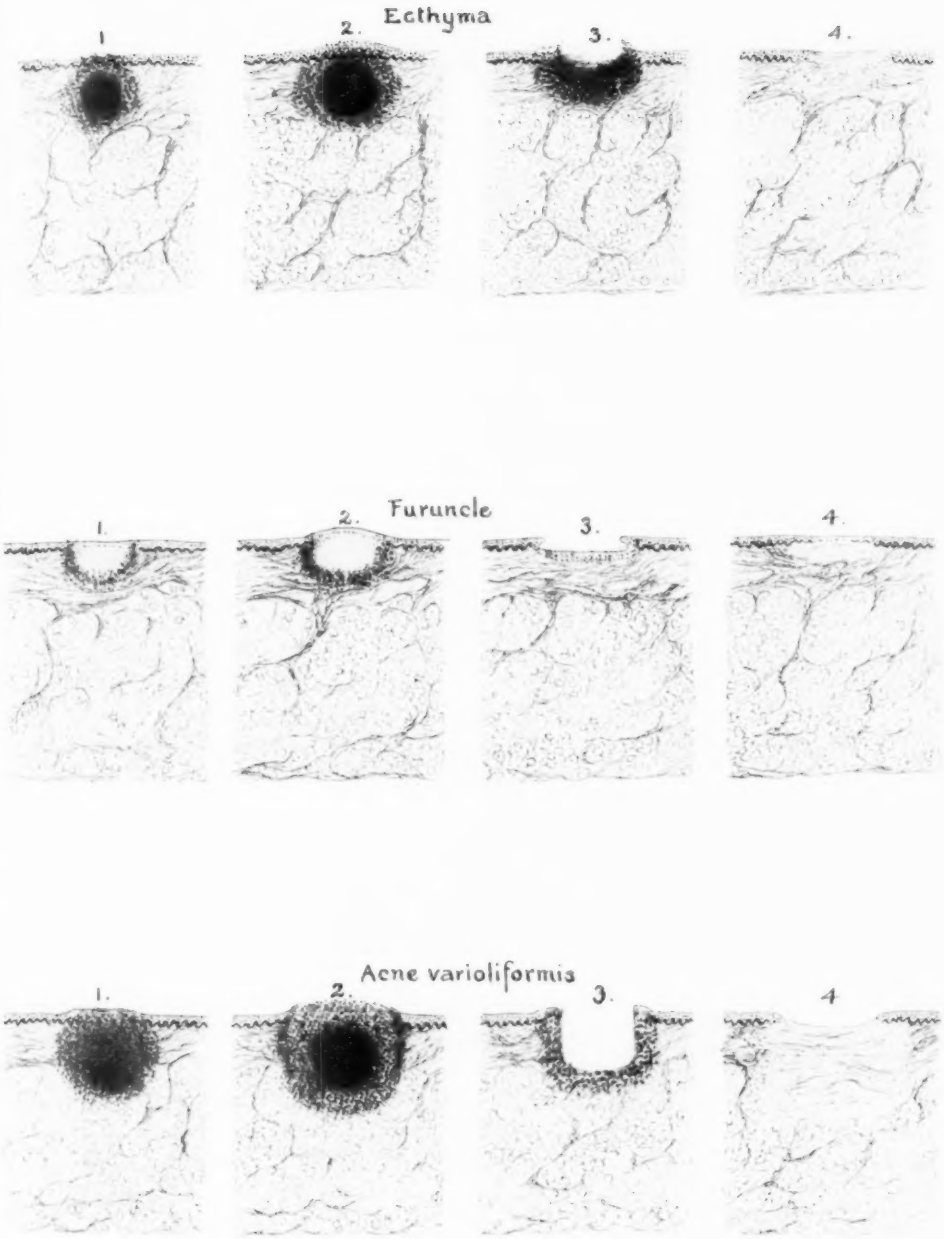

Fig. 1.—Acne varioliformis differs from furunculosis as follows: It is deeper, hemorrhagic, there is a central slough, it involutes more slowly, has more precipitous margins and the scar is depressed. From ecthyma the differences are not as marked. However, the margins are steeper, the central slough conspicuous and adherent, there is a surrounding woody edema, and the scar is varioliform.

Fig. 2.—Deep, hemorrhagic lesions with infiltrated margins at two upper positions produced by injection of streptococcus and staphylococcus. Below and at left, staphylococcus injection. Below and at right (simulates a bald spot) streptococcus injection. One week after injection.

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satellite ulcers had developed around them, and these eventually extended during the course of three months over the back to the neck, leaving minute, smooth, white scars devoid of hair.

Development of Lesions

	24 Hours	48 Hours	4th Day	7th Day	10th Day	15th Day	30 Days and 3 Mo.
Mixed culture.....	Erythema	Erythema and infiltration	.....	Sloughed	Deep ulcer	Deep ulcer	Still ulcerative; satellites
Staphylococcus....	Negative	Erythema	Swelling	Abscess; discharging pus	.....	Resolved; smooth scar	
Streptococcus.....	Negative	Erythema	Mild infiltration; no discharge	.....	Resolved; no scar		

Fig. 3.—Widespread extension of lesion over back of guinea-pig from experimental focus.

This guinea-pig was demonstrated before the Dermatological Society of Philadelphia in March, 1924, and at that time there was a deep-seated retrenched scar at the two upper sites, surrounded by a number of smaller white superficial scars. The latter extended upward well over the back of the animal together with small crusted lesions 3 to 4 mm. in diameter. These were almost dry, but some were still active and showed hemorrhagic infiltrations of the border. There was no free exudation of pus. *Staphylococcus pyogenes-aureus hemolyticus* and *streptococcus pyogenes hemolyticus* were isolated from the recent lesions (Fig. 3). At present (April, 1924,) the animal shows only smooth hairless scars.

Guinea-pig 6 received injections in a similar manner except that one mixed injection was given instead of two, and that 0.25 c.c. of culture was injected instead of 0.5 c.c. The lesions followed a course almost similar to that of those of guinea-pig 5, but were not as severe and healed entirely at the end of a month.

AUTOINOCULATION

After the biopsies, which have already been mentioned, satellite ulcers developed around the patient's biopsy wound, which itself became deeply ulcerative, and these ulcers were slow in healing. These satellites may be regarded as a first set of autoinoculations. Coincident with the animal work, the following inoculations were made on the back of the patient, in order to determine what kinds of irritants might be capable of producing the lesion of acne varioliformis. At the same time, we were informed concerning the smallpox status of the patient. All of the puncture sites were protected from external infection by dressings. The sites inoculated and materials used were as follows:

Site 1: 0.25 c.c. of eighteen hour broth culture of *Streptococcus pyogenes-hemolyticus* plus 0.25 c.c. of *Staphylococcus pyogenes-aureus hemolyticus*, both of which were isolated from the patient. Site 2: Antismallpox virus. Site 3: Pus from one of the young nodules on the patient's neck. Site 4: *Streptococcus pyogenes-hemolyticus*, 0.25 c.c. eighteen hour broth culture. *Staphylococcus pyogenes-hemolyticus*, same dose (these two cultures were from outside sources and were the same as the ones used in injecting Guinea-pigs 3 and 4). Site 5: 1 c.c. of sterile salt solution. This served as a control against the possibility of infection from invading the punctures from the surface. Site 6: 0.12 c.c. of turpentine.

Results Two Days After Injection.—Site 1: Reddening and infiltration at the site of injection; limited. Site 2: Formation of small number of minute vesicles containing clear fluid. Site 3: A marked infiltration around the site of inoculation. The center of the lesion was the seat of a red, strongly adherent necrotic slough. Site 4: The same as No. 3, but larger. Site 5: No reaction visible. Site 6: The region was much swollen and inflamed. There were a number of superficial pustules.

Four Days After Injection.—Site 1: A typical acne varioliformis lesion was present, a round ulceration of the skin, deep-seated and with hemorrhagic borders, and with surrounding inflamed tissue. The inflammatory reaction around this lesion was, however, milder than around the lesions at sites 3 and 4. Site 2: Typical purulent vaccination vesicles, from 4 to 5 mm. in diameter. Site 3: There was a lesion which to all intents and purposes was identical with those on the patient's neck. The lesion was still covered by a necrotic slough. Site 4: There was an ulcer 1 cm. in diameter, deep-seated and covered by a slough which was pulled out, leaving a necrotic, sanious bottom. The edges were hemorrhagic and infiltrated. The lesion was to all intents and purposes similar to the "spontaneous" ones, but the size was above the average, and the hemorrhagic areola was more marked. Site 5: There were no traces of inoculation. Site 6: A large irregular slough was discharged, leaving a deep-seated ulcer about 1.5 cm. in diameter, with clear-cut border. It was not infiltrated, but it was very painful (Fig. 3).

At the end of one month, all of the lesions had healed with the following results: Site 1: A small, soft, smooth, round, atrophic scar 6 mm. in diameter. Site 2: A typical vaccination scar. Site 3: A large, soft, smooth scar identical in character with those present elsewhere on the body. Site 4: A scar identical

Fig. 4.—The six positions at which injections were made were marked at the time of injection for identification by silver nitrate and the injections made with the angles: (1) Streptococcus and staphylococcus (autogenous), (2) antismallpox virus, (3) pus from young lesion on the patient, (4) stock culture of streptococcus and staphylococcus, (5) normal salt control, (6) turpentine. The large patch of lesions developed around the biopsy wound. All other lesions exhibited were present prior to the injections. The experimental lesions were six days old.

with that at site 3. Site 5: No sequelae. Site 6: A retracted hard scar similar to that following a burn.

Lesion 1 was not as violent and did not leave as large and typical a scar as did lesions 3 and 4, because the cultures used had been cultivated one

month in artificial mediums (planting every other day), while the cultures used in lesion 4 had been freshly isolated from pigs and were highly virulent.

ANALYSIS OF RESULTS

Site 5. This was the normal salt control, and no lesion developed. This, reasonably, eliminated the possibility of extraneous factors entering to complicate our deductions.

Site 2. The typical course of vaccina lesions was followed except that all of the stages were markedly shortened.

Sites 3 and 4. The expected happened in that the lesions and scars of acne varioliformis occurred as the result of injecting (1) patient's pus, (2) the two bacteria isolated from the patient, and (3) the same two isolated from outside sources.

At the turpentine site (Site 6), the developments were like those of acne varioliformis to the extent that the area affected was extensive, and that a slough was induced which left a deep ulcer with abrupt margins. They differed from acne varioliformis in that ulceration occurred early (on the fourth day), there was no hemorrhagic infiltration, the lesion healed in half the time the acne varioliformis lesion did, and the scar was smooth and not depressed. Some of these differences are easily explained on the basis of the one agent being vital and the other not, and on (character of scar) difference in depth of injection. After making allowances, we feel that the turpentine lesion has shown us that the reason for the punched-out, deep kind of ulcer is that necrosis was induced (occurred both in the turpentine lesion and in the acne varioliformis), and that the hemorrhagic qualities were referable to inherent traits of the streptococcus. Considering all six tests together, we feel justified in assuming that a combined action of staphylococcus and streptococcus is necessary to induce the hemorrhagic necrosis, deep ulceration, protracted duration and varioliform scarring that characterized the lesion of acne varioliformis in our case.

The natural course of events has not been perfectly followed in reproducing these lesions, for enormous numbers of bacteria, comparatively speaking, were introduced into the skin. This, however, is not a vital objection. It is granted that it would shorten the duration of the various stages of the lesion, but from the standpoint of size and otherwise, the result justified the method; the experimental lesions were not larger than many of the "spontaneous ones." All of the injections were made intradermally, not subcutaneously; so that there was no important error in the matter of depth of lesion. No exceptions may be made on the basis of tissue disruption at injection sites, because this factor was also operative at the control sites.

After securing the results described above, it was thought desirable to imitate natural conditions in the human subject yet more closely, and

accordingly rubbing was substituted for injection. Hair was pulled from the back of guinea-pigs to create favorable sites for invasion, just as may be assumed to obtain on human skin, and the mixed cultures were rubbed in. On the day after the application, a superficial pustule formed. This ruptured, crusting developed, and an infiltration of the surrounding skin began to appear. In four days, a deep, woody edema had supervened, and by the end of a week the central hemorrhagic slough came out, just as was noted in human cases. The lesion reached its maximum size in ten days.

In order to determine whether other necrosis-producing agents than the streptococcus could act in conjunction with the staphylococcus in producing acne varioliformis lesions, a 0.1 c.c. of croton oil plus 0.25 c.c. of staphylococcus was injected into a guinea-pig. A lesion formed in four days, which was almost similar to those obtained by using the streptococcus and staphylococcus mixture. In this case, croton oil furnished the necrotic element, usually a prerogative of the streptococcus.

Case 2.—S. A. B., a white man, aged 53, had had the disease for one year. The lesions were present over the scalp and face and especially over the bearded region. They were not present over the shoulders or elsewhere. They were identical in character with those already described in our Case 1, but they were not as numerous, nor as large or deep. The patient has not had any treatment for three months.

Cultures from deep, fresh lesions resulted as did those of Case 1, i. e., they showed numerous colonies of both *Streptococcus pyogenes-hemolyticus* and few of *Staphylococcus aureus-pyogenes hemolyticus.* The identification of these cultures was carried out as was the identification of those from Case 1. Identical results were obtained from two lesions of the forehead and one at the nape of the neck. No injection tests were performed with this material.

As to further events, Dr. George Taggart, who referred the patient to us, reports as follows:

"I vaccinated him two weeks ago, and he had a slight reaction on the second and third day, that is, he felt a little sick, chilly and feverish, but the vaccination is taking now. I vaccinated him again, a week ago, and he had the same reaction and symptoms, but as yet the vaccination shows no signs of taking.

He was vaccinated at the age of 6 with a successful take at once, and again at 37. He has been exposed to smallpox but has never contracted the disease."

BIBLIOGRAPHIC REVIEW

Although numerous papers have been written from the standpoint of the lesions of acne varioliformis and similar lesions, little has been done, except to speculate, toward the solution of the problem of the etiology of the affection, and practically nothing has been done in the way of experimental research. The only field investigated was the supposed tuberculous origin of the lesion. Thus, neither Barthélemy [3]

3. Barthélemy, M.: De l'acnitis, Ann. de dermat. et. syph. **2**:1, 1891.

nor Gardiner [4] found tubercle bacilli in biopsy tissue, and inoculation by the latter into guinea-pigs was negative in a case of acne necrotica—a form which Fordyce [5] considered identical.

It is true that cocci and bacilli were found in the sections, usually from biopsy material, by a number of authors. Fordyce,[6] employing a lesion which had developed as far as the formation of a central necrotic mass, found a few slender bacilli in the tissue of the corium adjacent to the suppurating mass; and in the granular débris surrounding the abscess cavity small cocci in groups were present. The presence of these micro-organisms, however, was attributed by the author to secondary infection, and the finding was not accorded any causal importance. Touton [7] expressed a similar view in a case of acne necrotica (Boeck). He found, in the upper layers of the necrotic tissue and in the hair follicles, staphylococci and other micro-organisms, but he considered the occurrence as an accidental one. Boeck [8] in his case of acne necrotica, found large colonies of cocci in the superficial portion of the section, which he considered contaminants. But he did not extend this view to large cocci and small staphylococci comprised in a gleal mass, which he found in deep tissue below the hair follicles. In addition, he found double contoured fungus spores. Cultures were made, but results were incomplete and unsatisfactory; however, Boeck laid much stress on the importance of cultural studies toward clearing the question of the etiology of the disease. Pollitzer,[9] apropos of his case of hidradenitis destruens suppurativa, expressed the same view on the importance of cultural studies and considers the lesions of infectious origin, although no bacteria were found in his section, and agar plate cultures remained sterile.

Likewise Schamberg,[10] in a case of acnitis, found no bacteria in his sections. Cultures were made with many different mediums from an abscess previously opened and also from an old necrotic node. One of the cultures, from an abscess which had been previously opened,

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4. Gardiner, F.: Acne necrotica, Inter. Clin., Philadelphia, **27**:104, 1917.

5. Fordyce, J. A.: A Contribution to the Pathology of Acne Varioliformis Hebrae, J. Cutan. Dis. **12**:152, 1894.

6. Fordyce, J. A.: A Contribution to the Pathology of the Acne Varioliformis Hebrae, J. Cutan. Dis. **9**:128, 1891.

7. Touton, quoted from Fordyce: Verhandl. d. deutsch. dermat. gesellsch., Zweiter und Dritter Congress.

8. Boeck, C.: Ueber Acne frontalis necrotica, Arch. f. Dermat. u. Syph. **21**:37, 1889.

9. Pollitzer, S.: Hydradenitis destruens suppurativa, J. Cutan. Dis. **10**:9, 1892.

10. Schamberg, J. F.: A Study of Acnitis with the Report of an Extensive Case, J. Cutan. Dis. **27**:14, 1909.

showed few staphylococci, doubtless a contaminant. The nodule yielded a culture of pseudodiphtheria bacillus. The results were considered negative.

SUMMARY AND CONCLUSIONS

Two cases of acne varioliformis which were distinctive by reason of deeply necrotic and hemorrhagic centers and surrounding woody edema yielded both staphylococci and streptococci in culture.

They were also present in the nose and throat in one case.

Lesions identical in morphology with those of acne varioliformis were reproduced in the patient by the intradermic injections of these two organisms (both autogenous and stock), and comparable ones were repeatedly produced in guinea-pigs.

It follows from the foregoing that the organisms are not of a strain specific for this disease, and that a tuberculous factor can be definitely excluded from some cases of acne varioliformis.

This combination of organism, in yielding so characteristic a lesion, might be useful in other experiments having other bearings, such as the general subject of distribution of lesions.

It is possible that the dusky, necrotic, indolent characters of tuberculosis have been referred to the somewhat similar ones of a streptococcus, and that this is responsible for some of the present ideas of the tuberculous nature of acne varioliforims.

In the furunculoid state which is known as acne varioliformis, different organisms may be operative. The cause of one type is a staphylococcus and streptococcus, neither of which of itself can produce the typical lesion. The deep position of the organism explains the varioliform type of scar. The hemorrhage, necrosis, woody edema and the slow healing reflect known traits of streptococcus.

PRECANCEROUS DERMATOSES

REPORT OF A CASE *

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Bowen,[1] in 1912, first noticed and described the so-called precancerous dermatoses. He reported six cases which were peculiar and apparently rare, although he believes that such cases will be recognized more commonly than they have been. In these reports, he concludes:

> Precancerous dermatoses, while it cannot be advocated as an exact term, serves to call attention to the group of cutaneous affections which includes Paget's disease of the nipple, xeroderma pigmentosum, keratoses senilis, arsenical keratosis, etc., in all of which carcinoma results much more frequently than in other skin affections, and all of which have many points of histologic resemblance. The cases under consideration belong to this category, at least for purposes of study, until a more scientific and exact classification can be offered.

In 1914, the subject was greatly elaborated and clarified by Darier.[2]

In 1920, he[3] again published an article on precancerous dermatoses, in which he reported a case, and concluded that the precancerous dermatoses of Bowen had clinical and histologic characters so distinct that a diagnosis could be made without any knowledge as to the onset or development of the tumor.

Previously, Dubreuilh[4] under the heading "Precancerous Dermatoses," discussed cornu cutaneum, senile keratoma (keratosis senilis), xeroderma pigmentosum, arsenical cancer, chimney sweeps' cancer, cancer in paraffin and tar workers and leukokeratoses.

In 1903, Hartzell[5] called attention to some precancerous affection of the skin. His article contained a review and a bibliography.

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* From the Department of Pathology and Bacteriology of the Medical College, Keio Giziku University.

1. Bowen, J. T.: Precancerous Dermatoses: The Further Course of Two Cases Previously Reported, J. Cutan. Dis., May, 1912; ibid., December, 1915; Arch. Dermat. & Syph. **1**:23 (Jan.) 1920.

2. Darier: La Dermatose precancerous de Bowen, dyskeratose lenticulaire et en disques, Ann. de dermat. et syph., August-September, 1914.

3. Darier: Precancerous Dermatoses of Bowen, Ann. de dermat. et syph., 1920, No. 2, p. 49.

4. Dubreuilh: Ann. de dermat. et syph. 1902, p. 1158.

5. Hartzell: J. Cutan. Dis. 1903; p. 455.

In 1915, Engman,[6] in an article on "Precancerous Conditions of the Skin," noticed that the clinical factors which predispose the skin to cancer are senility, actinism, chemical trauma, mechanical trauma and chronic inflammatory disease.

Anton Tryb [7] says:

> Wir wollen dasselbe nicht von der Eingriffen der Autoren behaupten, aber es wäre möglich, dass auch hier irgend welche Reize (Urin Mazeration) auf ursprunglich gutartige Wucherung sine bäsartigen Einfluss gehabt haben können.

Marrow and Lee [8] reported two cases of the Bowen type of epithelioma in which three types of visible manifestation of the malady were noted, namely: the nodule, the plaque, and the fungus growth, and concluded:

> It is to the plaque-form of the disease that the term "precancerous" is applicable; but since the plaque is only one variety of the affection, and inasmuch as the other types are characteristically epitheliomatous, it seems best, for the present at least, to class the malady under the name of Bowen's type of epithelioma.

Taussig [9] says:

> In my experience, leukoplactic vulvitis may show periods of temporary improvement, but is not cured. In two thirds of the cases it leads to cancer and in the remaining persists until the death of the patient unless excised.

In 1921, Chargin [10] reported one case. He said that, although the patient presented many of the characteristics of xeroderma pigmentosum, others were absent, such as the telangiectasia, the general thinning or parchment-like skin. After making a biopsy, Highman,[11] at the same meeting, reported precancerous dermatosis.

Sequeira [12] described a case of precancerous dermatosis of Bowen occurring in a woman. His article contains a summary of the cases reported by Bowen and Darier.

Although many careful studies of precancerous dermatoses have been reported in America, England, France and Germany, I could not find any reference to this condition in the literature in Japan, in spite of the fact that a large number of cases of cancer of the penis are reported.

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6. Engman: J. Lab. & Clin. Med., October, 1915, p. 31.
7. Tryb, Anton: Ein Beitrag zur Kenntnis der präkanzerösen Wucherungen, Dermat. Wchnschr. **60**:31 (June) 1915.
8. Marrow and Lee: J. Cutan. Dis. **36**:11 (Jan.) 1918.
9. Taussig, F. J.: Precancerous Lesions of the Skin of the Vulva, Arch. Dermat. & Syph. **1**:621 (June) 1920.
10. Chargin: Arch. Dermat. & Syph. **3**:94 (Jan.) 1921.
11. Highman: Arch. Dermat. & Syph. **1**:95 (Jan.) 1921.
12. Sequeira: Brit. J. Dermat.& Syph. **33**:173 (May) 1921.

Great effort has been made to determine the etiologic factors of cancer. A careful review of the literature, however, has shown that none of the theories advanced has explained all of the facts. Thiersch's theory of a destruction of balance of the tissues recently lost its stanchest advocate. Ribbert modified this theory by combining it with Cohnheim's blast theory, but neither Ribbert's nor Cohnheim's theory can account for many tumors in which there are characteristics of atypical proliferation and clinical malignancy. There are many other theories, such as Hanseman's anaplasia of the epithelial cells, Hauser's new cell race, Beneke's cataplasie, Hertwig's return of cells from the organotypical to the zytotypical growth, and Ehrlich's specific nutritive or growth element. These theories also serve to account for certain facts. Recently, the parasitic theory seems to be supported less vigorously. In short, internal etiologic factors of cancer, such as age, heredity, embryonic rest, metabolic disturbance and connective tissue changes, are less emphasized in the etiology of carcinoma of the skin on account of the greater rôle played by various forms of chronic irritation, which are external factors. Although it is difficult to be sure that these are important and definite, and that they have any specific action, they seem to determine the site of the carcinoma. Therefore, until we know more of the internal physiology and chemistry of the epithelial cell, we shall have to admit that these functions may be subject to malignant change through these external factors alone, and that there are various degrees of changes in this direction. Bowen [13] says that the term "precancerous dermatoses" applies to this group of skin diseases: keratosis senilis, xeroderma pigmentosum, Paget's disease, arsenical keratosis, etc., in all of which carcinoma results much more frequently than in other skin affections.

For the present at least, I believe that under the term "precancerous dermatoses" we should classify conditions ranging between these diseases and typical cancer. Of course, the benign conditions gradually become malignant, so that there is no sharp line of demarcation between the two types. Highman [11] says that this term is a misnomer and unscientific. Borst [14] quotes from Aschoff's textbook as follows:

> Mit Paltauf ist aber darauf hinzuweisen, dass diese sogenannten präcancerösen Affektionen jedenfalls kein notwendiges Glied in der Kette der zur Krebsbildung fuhrenden Veränderungen sind, indem sie durchaus nicht regelmässig, sondern in Gegenteil nur selten zum Krebse führen.

Doubtless, however, there is a transitional form between them clinically and histologically, even though Ribbert [15] denied such an

13. Bowen, J. T.: Precancerous Dermatoses, Arch. Dermat. & Syph. **1**:23 (Jan.) 1920.

14. Borst: Pathologische Anatomie von Aschoff, Allg. Teil, 1921, p. 794.

15. Ribbert: Geschwulstlehre, 1914.

Fig. 1.—Low power magnification of the racemose downgrowth of epidermis and elongated papillar. Edema of the corium and areas rich in cells.

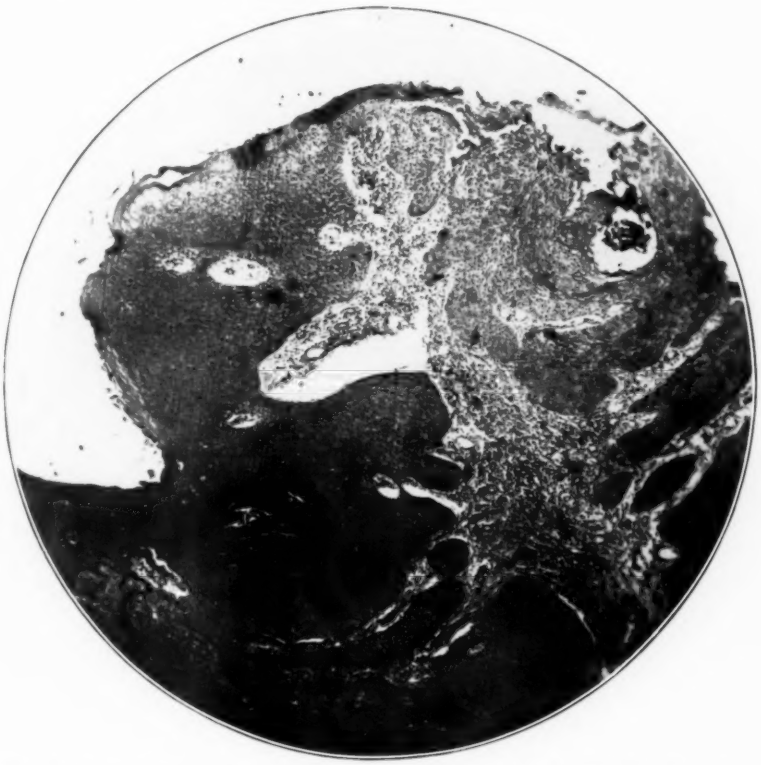

Fig. 2.—Low power magnification of the racemose and irregular downgrowth of epidermis and elongated papillar. Edema of the corium and areas rich in cells.

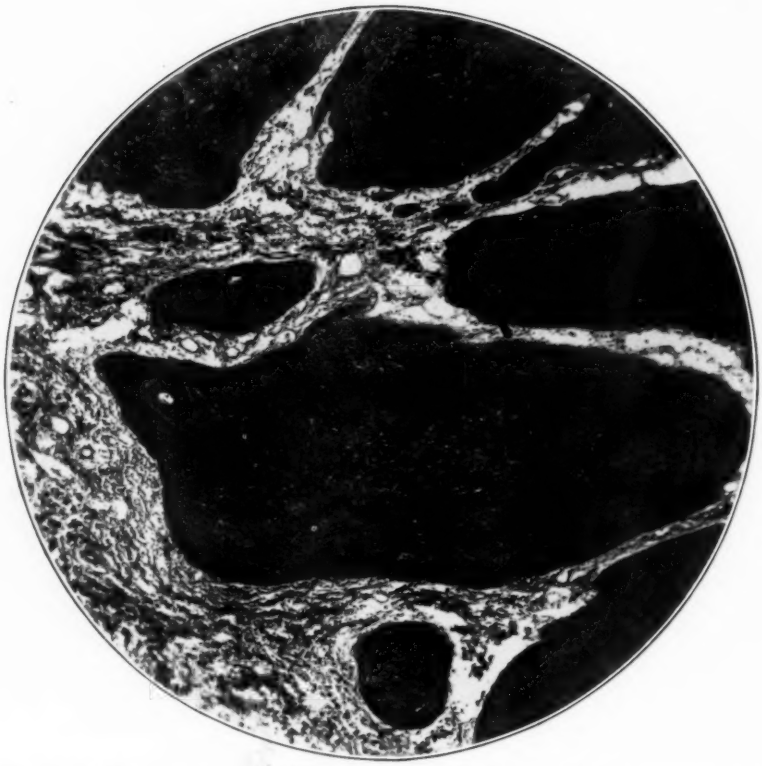

Fig. 3.—High power magnification of location of pathologic process in the corium just beneath the epidermis. There is edema of the connective tissue and cell infiltration. One of the epidermis islands is seen in the center of which the so-called "pearls" appear.

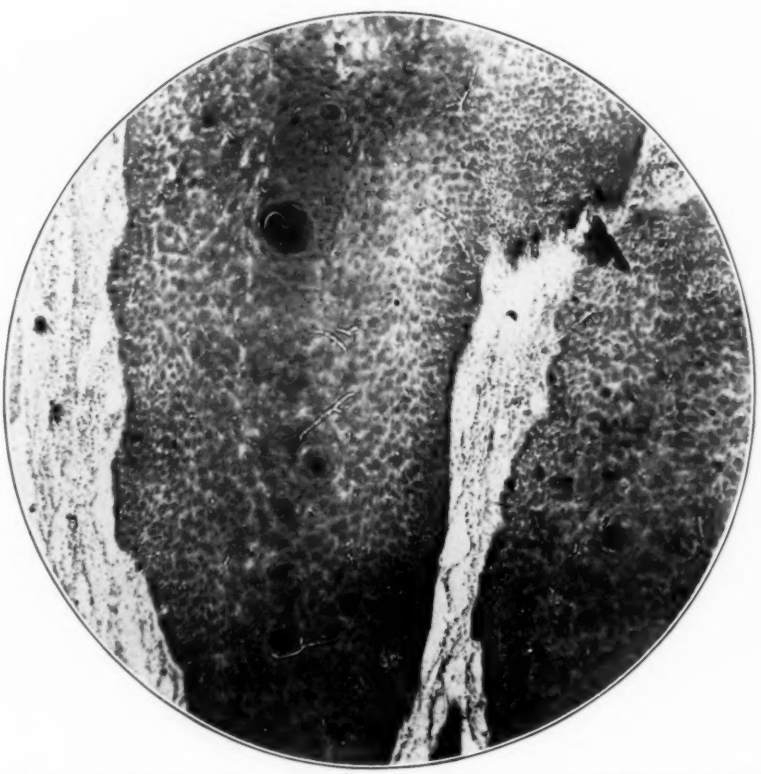

Fig. 4.—High power magnification of the downgrowth of epidermis in which the rete cells were irregular in size and shape; intercellular edema and so-called "pearls."

occurrence. Thus this term is not exact, but it seems to be of value in classification, at least for purposes of study, until, as Bowen said, a more scientific and exact classification can be offered.

I report the following case, because the clinical features and pathologic findings are of sufficient interest to merit record.

REPORT OF A CASE

History.—Mr. A., aged 48, a carpenter, of medium height and weight, and apparently in good physical condition, recently presented himself at the Nagasaki Dermato-Urological Hospital. There was no history of cancer in the family. The cause of his fathers death at an old age was unknown; his mother died of pneumonia at the age of 58. There were six children in the family, four boys and two girls, living and well, except one brother whose death was caused by "stomach trouble."

The past history was of no importance. The patient had been in excellent health all his life, with the exception of having gonorrhea at the age of 20. The present condition began about two years before on the right side of the coronary sulcus. At that time, the patient noticed a small, beansized, firm, yellowish red papule. In a few weeks it ulcerated, but disappeared on treatment. About a year later, a similar ulcer reappeared in the same place; it was clearly defined, pale yellow to dull red, slightly elevated, painless and infiltrated. As the ulcer was considered syphilitic, the patient was given two injections of arsphenamin, without any favorable effect. The nodule was removed after two months by excision. About six months before I saw him, a third ulcer appeared in the same place. It gradually developed into a papillary cauliflower-like ulcer.

Examination.—On admission to the hospital, there was a moderate swelling of the penis, and on the right side of the coronary sulcus, there was a sharply defined, oval ulcer 2 cm. in its widest diameter. The periphery was conspicuously infiltrated, firm, irregular, slightly elevated, not undermined, with little warty growth, and was yellowish red. The surface of the central area was lower than that at the edges, uneven, with a tendency to granulate; it was florid, intensely red, somewhat hardened, and exhibited a fine papilli. The discharge was scanty and odorless. The inguinal glands of the right side were moderately enlarged. The Wassermann test was negative.

Histologic Examination.—Sections were taken from different parts of the lesion, hardened in 4 per cent. formaldehyd solution and alcohol, and embedded in paraffin in the usual manner. Hematoxylin-eosin, polychrome methylene blue, Weigert's resorsin-fuchsin and van Gieson's connective tissue stains were used.

The epidermis was thickened at the border of the lesion. In some parts of the outermost layer of the stratum corneum a small number of cells occasionally were encountered which had not undergone the natural process of cornification. There was marked proliferation of the cells in the rete Malpighii, with an intercellular edema. The cells were of an irregular form; the cell-growth course downward appeared in the form of racemose prolongation. These prolongations were comparatively numerous in the center of the ulcer. The space between the rete cells was enlarged, and in this space and around the cells there were small numbers of leukocytes. In these layers, there were numerous atypical cellular changes; many of the cells were irregular in shape, and a few

were unusually large. Their nuclei were irregularly placed, multiple, much larger than normal, generally deeply stained, and two or more nuclei appeared in one cell membrane—some seemed to be fused together. Some of them were enormously increased and stained lighter. The cells in rete, especially, were often arranged in rows, closely resembling grains of corn on the cob. The most noteworthy changes of the cells were the formation of the onion-like bodies, the so-called "pearls," "cellnests" or "globes," which appeared here and there in various sizes in layers of the epidermis. The corium showed changes from the normal state; the papillary body projections were irregularly prolonged in the form of ramifications, and in some places it extended far up to the epidermis, chiefly evidenced by a dilatation of the blood vessels and lymph spaces, the increase of the mass of the connective tissue elements with corresponding small round cells, plasma cells and a few leukocytes, as well as varying degrees of edema. Here and there, in the edematous papillary layer, appeared many epidermal islands of various sizes, in the center of which "pearls" sometimes occurred. In the subpapillary layer in the edematous layer, there were larger and smaller, and more or less sharply circumscribed areas rich in cells with sparse connective tissue bundles. In some parts, these areas appeared perivascular, round or oval and in places in vertical processes. The cells were chiefly of the small round type which is well formed and has a deeply staining nucleus and a small rim of acidophilic protoplasm. In these areas, numerous young connective tissue cells and plasma cells were also seen throughout the corium. The blood vessels were dilated; their walls were thickened, and their endothelial lining was edematous. There was a definitee increase in the amount of fibrous tissue of the corium, with no noteworthy change in the elastic tissue. In the sections stained with polychrome methylene blue, numerous mast cells were observed. They were encountered mostly in the areas of infiltration and in many places in the corium.

SUMMARY

Clinically considered, my case falls under the category of the papillary or papillomatous variety of cancer, based on the following points: the advanced age of the patient, the course of the condition, especially the frequent recurrence, the characteristic appearance of the border of the ulcer, the hard and elevated infiltration, the cauliflower-like features of the ulceration, its slow progress and its site of predilection on the penis.

However, from the histologic point of view and according to my experience, the proliferation of the epithelial cells, the downward growth in the form of ramifications and the tendency to invade the deep layer of the corium, are too slight evidence of cancer, although few so-called "pearls" were found. In fact, it is often difficult to determine the diagnosis between the highly atypical growth and the beginning of malignant carcinoma, both histologically and clinically considered. Friebaes says in this textbook that:

Eine Verwechslung mit einem beginnenden Karzinom ist bei einer typisch ausgebildeten Warze eigentlich ausgeschlossen; da ja aber gelegentlich auch eine einfache Warze maligne werden, d. h. aus ihr sich ein Karzinom entwick-

elen kann, wie das auch bei der Psoriasis verrucosa angeführt worden ist, so wird man selbstverständlich jedes stärkere atypische Wachstum mit Bildung von geschichteten Hornperlen u. s. w., mit Argwohn betrachten.

Ehrmann [16] assumes:

Die Differentialdiagnose von den klinisch ähnlichen Prozessen ist leicht, nur die Unterscheidung von einem malignen Epitheliom kann unter Umständen Schwierigkeiten machen.

Borst [14] also pointed out in Aschoff's textbook that "Die Entscheidung, ob nicht beginnendens Karzinoma vorliegt, kann manchmal unmöglich sein."

As there is no sharp line of demarcation between the benign and the malignant neoplasma, I believe that my case should be classified under the so-called precancerous dermatoses at least for the purpose of study, until a more scientific and exact calcification can be made.

16. **Ehrmann**: Kompendium der spezieller Histo-Pathologie der Haut, 1906, p. 120.

CLINICAL STUDIES ON THE KAHN REACTION FOR SYPHILIS

I. DIAGNOSTIC VALUE OF TEST *

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Recent improvements in the Kahn precipitation test have given a new impetus to the study of the serum diagnosis of syphilis with this method. All reactions—weak as well as strong—are now completed within some minutes after mixing serum with antigen. Constancy of results in the hands of different workers has been made possible by standardizing the various steps of the technic. Aside from the routine procedure with serum, the test offers a special method for the quantitative determination of the reacting substances in syphilitic serum, applicable especially to the serologic study in cases in which the patient is undergoing specific treatment, a "presumptive" procedure of unusually high sensitiveness applicable to special cases, and a procedure for testing spinal fluids.[1]

No less important than the practical value of the Kahn precipitation test as a diagnostic agent is the applicability of the test to research in syphilis. We know almost as little of the mechanism of complement-fixation in its relation to the serology of syphilis, particularly the rôle of beef heart antigen, as we knew in the early days of the Wassermann test, fifteen years ago. When we consider that in the Wassermann test the inter-reaction between serum and antigen is measured indirectly by fixation or disappearance of complement—an extremely variable element—and the disappearance of complement in turn is measured by hemolysis of red cells, we can understand why our knowledge in this field has not advanced. In the precipitation test, however, the inter-

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* Studies and contributions of the Department of Dermatology and Syphilology of the University of Michigan, service of Dr. Udo J. Wile, and from the Bureau of Laboratories, Michigan Department of Health.

1. Kahn, R. L.: The Kahn Precipitation Test for Syphilis, Demonstration, Am. J. Pub. Health **14**:498 (June) 1924. Serum Diagnosis of Syphilis by Precipitation: Governing Principles, Procedure and Clinical Application of the Kahn Precipitation Test, Baltimore, Williams & Wilkins Company, to be published.

reaction between serum and antigen is measured directly by the degree of precipitation. It is reasonable, therefore, to expect that the ultimate solution of many of the problems associated with the serology of syphilis lies in the realm of precipitation.

Perhaps the most outstanding principle governing the Kahn precipitation test is concentration of the ingredients entering into the test, it having been shown that dilution delays or inhibits precipitation. Next in importance is marked instability of the antigen dilution, experiments having indicated that a stable antigen dilution gives less sensitive reactions. Of great importance also is proper relation between serum and antigen based on the requirements of serum from different conditions of syphilis. These and other factors governing the test are fully considered elsewhere.

Keim and Wile [2] were the first to study the clinical value of the earlier procedure of the Kahn precipitation test. According to their conclusions, the test had basic value as a means for the serum diagnosis of syphilis. Numerous other workers have since corroborated their findings.[3] Rothberg [4] and Osmond and McClean [5] have reported favorably on the test embracing the recent improvement. Keim,[6] in a comparative study of the earlier and present procedures, reported results pointing toward the superiority of the present procedure.

The abundance of clinical material available at the department of dermatology and syphilology of the University of Michigan Hospital and the ease with which the laboratory examinations could be made in the Michigan Department of Health laboratories, where the Kahn test is carried out as a routine procedure, led us to undertake a series of studies on the clinical value of the test. This series is being continued and

2. Keim, H. L., and Wile, U. J.: The Kahn Precipitation Test in the Diagnosis of Syphilis: A Preliminary Study, J. A. M. A. **79**:870 (Sept. 19) 1922.

3. Young, C. C.: Public Health Value of the Kahn Test for Syphilis: A Preliminary Report Based on Five Thousand Examinations, J. A. M. A. **79**:1674 (Nov. 11) 1922; The Kahn Test for Syphilis in a Public Health Laboratory, Am. J. Pub. Health **13**:96 (Feb.) 1923; Kahn Precipitation Test for Syphilis, Two Years' Experience in a Public Health Laboratory, Am. J. Pub. Health **14**:508 (June) 1924. Ishii, O.: Comparative Studies on the Kahn Precipitation Test for Syphilitic Serum and the Wassermann Test, Arch. Dermat. & Syph. **9**:612 (May) 1924. (A complete list of references will appear in reprints.)

4. Rothberg, W.: A Comparative Study of the Kahn Precipitation Test with the Kolmer Modification of the Wassermann, Abstracts Bacteriol. **8**:29 (Jan.) 1924.

5. Osmond, T. E., and McClean, D.: A Comparison of the Kahn and Wassermann Test in 500 Serums, Brit. M. J. **1**:617 (April 5) 1924.

6. Keim, H. L.: Further Observations of the Kahn Reaction in the Serologic Diagnosis of Syphilis, Am. J. Syph. **8**:323 (April) 1924.

includes studies on the sensitiveness of the test in cases in which patients are undergoing treatment; the value of the test with spinal fluids, the behavior of the test in the various dermatologic conditions, in the febrile diseases, in pregnancy, in exophthalmic goiter, etc.; and the value of the special quantitative and presumptive procedures. In this paper, the results of studies on the value of the test as a specific diagnostic agent in syphilis are presented.

GENERAL PLAN OF INVESTIGATION

Blood specimens were obtained from patients entering the University of Michigan Hospital. Part of each specimen was submitted for a Wassermann test to the serologic laboratory of the state psychopathic hospital at Ann Arbor and another for Kahn and Wassermann tests at the Michigan Department of Health laboratory at Lansing. The specimens submitted had no indication as to the clinical diagnosis. The Kahn tests were carried out on the same day the specimens reached the laboratory and the Wassermann tests on the following day, this being the routine procedure with all blood specimens examined in the state laboratory. At the Ann Arbor laboratory, the Wassermann test was carried out with a cholesterinized antigen employing overnight fixation at icebox temperature, while at the the state laboratory the test was performed with a cholesterinized antigen using one hour fixation at icebox temperature. The Kahn test was thus compared with two different Wassermann tests—one believed to be highly sensitive and the other more conservative in character. The results of these examinations, on receipt at the dermatological department of the University of Michigan Hospital, were classified and compared with the clinical diagnosis.

THE KAHN TEST IN THE DIAGNOSIS OF SYPHILIS

This study is based on 2,600 cases. A classification of these cases is given in Table 1. The cases other than syphilis include the more common dermatoses seen in dispensary practice, together with numerous subacute and chronic surgical conditions as well as many cases of general medical interest. The latter include many patients with diabetes, thyroid disease, carcinoma, heart, lung and gastro-intestinal disorders.

The results with the Kahn test as recorded in the tables represent the average of the findings with the three tube test. Thus, if the reaction is four plus, it means that the precipitation results in each of the three tubes was four plus; if the reaction is two plus, the result in the three tubes might have been, for example, negative, two plus, four plus.[1] An outline of the test and the interpretation of the results are given in Table 10. It should be stated in this connection that the accep-

TABLE 1.—*Classification of Cases*

Condition	Number of Cases
1. Primary syphilis	25
2. Secondary syphilis	64
3. Tertiary syphilis excluding cerebrospinal	87
4. Cerebrospinal syphilis	192
5. Latent syphilis	218
6. Congenital syphilis	39
7. Other than syphilis	1,975
Total	2,600

TABLE 2.—*Primary Syphilis*

	Number of Cases	Kahn Reaction	Wassermann Reaction Cholesterinized Antigen		Treatment
			18-Hour Fixation Icebox	1-Hour Fixation Icebox	
Agreement	14	++++	++++	++++	
	8	—	—	—	
Divergence	1	++++	++++	+++	No history
	1	++++	++++	++	No history
	1	++++	—	++++	No history

TABLE 3.—*Secondary Syphilis*

	Number of Cases	Kahn Reaction	Wassermann Reaction Cholesterinized Antigen		Treatment
			18-Hour Fixation Icebox	1-Hour Fixation Icebox	
Agreement	61	++++	++++	++++	
Divergence	1	++++	++	++++	No history
	1	+	±	±	Indifferent
	1	—	±	—	Well

TABLE 4.—*Tertiary Syphilis Excluding Cerebrospinal*

	Number of Cases	Kahn Reaction	Wassermann Reaction Cholesterinized Antigen		Treatment
			18-Hour Fixation Icebox	1-Hour Fixation Icebox	
		Cutaneous and Mucous Membrane			
Agreement	28	++++	++++	++++	
	2	—	—	—	
		Osseous System			
	11	++++	++++	++++	
	3	—	—	—	
		Visceral			
	21	++++	++++	++++	
	2	—	—	—	
		Cutaneous and Mucous Membrane			
Divergence	1	++++	±	±	No history
	1	++++	—	++++	No history
	1	++	—	—	No history
	1	—	++	—	Thorough
		Osseous System			
	1	++++	++++	+	Indifferent
	1	++++	+++	±	Thorough
	1	++++	±	—	Indifferent
	1	++++	—	++++	Indifferent
		Visceral			
	5	++++	++++	++	
	2	++++	++++	+	
	1	++++	++++	±	Indifferent
	1	+++	++++	±	Indifferent
	1	+++	—	±	Thorough
	1	+	++++	++	Indifferent
	1	+	—	—	No history

tance of an average finding was purely arbitrary. Observations indicated that the average finding of the three tubes corresponded with the final result of a conservative Wassermann test.

Primary Syphilis.—In practically 90 per cent. of the cases of primary syphilis examined, there was uniform agreement in the three reactions. The variants furthermore were strongly positive with the Kahn test, while a negative test was obtained in one case with the long icebox fixation Wassermann reaction and two weaker reactions with the less sensitive complement-fixation test. This is in accordance with the previous findings of Keim and Wile, and strengthens our belief that the simple precipitation test is slightly more sensitive than the Wassermann test in primary syphilis.

Secondary Syphilis.—As one might anticipate, there is complete agreement in practically all of the cases of secondary syphilis examined. The three examples in which a divergence of results was obtained were cases of late, recurrent secondary syphilis.

Tertiary Syphilis.—It will be seen from Table 4 that the Kahn reaction is somewhat more sensitive than the complement-fixation test in late involvement of the skin and mucous membranes. Also in late syphilis of the osseous system it would appear that the precipitation test is decidedly more sensitive. This again corroborates the previous findings of Keim and Wile and is of especial value in a group of cases that frequently do not react strongly with the Wassermann test.

Seemingly, in visceral syphilis, the long icebox fixation Wassermann test is slightly more sensitive, although the precipitation test gave reactions in two cases in which this Wassermann test was negative.

Cerebrospinal Syphilis.—It will be seen from Table 5 that the Kahn test is slightly less sensitive than the long fixation Wassermann reaction in central nervous system syphilis. This is particularly true in the diffuse type of involvement. In general paralysis and tabes dorsalis it compares more favorably in point of sensitiveness. However, in each group of cases it is notably ahead of the short fixation Wassermann test .

Latent Syphilis.—As we must depend on serologic help in the diagnosis for this large group of asymptomatic cases, it is essential for any biologic test to possess a high degree of sensitiveness in latent syphilis. It will be seen from Table 6 that the simple precipitation test compares favorably with the highly sensitive Wassermann test.

Congenital Syphilis.—More than 70 per cent. of the cases of congenital syphilis examined agreed in the three tests employed. In those cases in which a divergence was encountered, it will be seen that the Kahn test is decidedly more sensitive than the "conservative" Wassermann reaction. It is also to be noted that it is slightly more sensitive than the long fixation Wassermann reaction.

TABLE 5.—*Cerebrospinal Syphilis*

	Number of Cases	Kahn Reaction	Wassermann Reaction Cholesterinized Antigen: 18-Hour Fixation Icebox	Wassermann Reaction Cholesterinized Antigen: 1-Hour Fixation Icebox	Treatment
		Diffuse			
Agreement.....	53	++++	++++	++++	
	9	—	—	—	
		Tabes Dorsalis			
	24	++++	++++	++++	
	5	—	—	—	
		General Paralysis			
	46	++++	++++	++++	
	2	—	—	—	
		Diffuse			
Divergence.....	3	++++	++++	++	
	6	++++	++++	+	
	2	++++	++	++	Indifferent
	1	++++	—	+	Thorough
	2	+++	+++	++	
	3	+++	++	+	
	1	+++	±	—	Thorough
	2	++	++	+	No history
	3	++	++++	++	
	1	+	++++	±	Thorough
	1	+	++++	+	No history
	1	—	++	—	No history
	2	—	+++	—	Indifferent
	1	—	++++	—	Indifferent
		Tabes Dorsalis			
	4	++++	++++	++	
	1	++++	++++	+	No history
	1	++++	++++	—	Thorough
	2	++++	++++	+	Thorough
	1	+++	++	+++	Indifferent
	1	++	++++	++++	Thorough
	1	—	++++	—	Thorough
		General Paralysis			
	3	++++	++++	+++	No history
	2	++++	++++	++	Indifferent
	3	++++	++++	±	
	1	++++	+	++++	Indifferent
	1	+++	++++	++++	No history
	1	+++	+++	+	Thorough
	1	++	++	±	Indifferent
	1	—	++	—	Thorough
	1	—	++++	—	Thorough

TABLE 6.—*Latent Syphilis*

	Number of Cases	Kahn Reaction	Wassermann Reaction Cholesterinized Antigen: 18-Hour Fixation Icebox	Wassermann Reaction Cholesterinized Antigen: 1-Hour Fixation Icebox	Treatment
Agreement.....	118	++++	++++	++++	
	27	—	—	—	Thorough
Divergence.....	5	++++	++++	+++	No history
	11	++++	++++	++	
	10	++++	++++	+	
	6	++++	++++	±	
	3	++++	++++	—	
	1	++++	+++	—	Thorough
	1	++++	++	—	No history
	1	++++	—	++++	Thorough
	2	++++	—	+	Thorough
	1	+++	++	++	Indifferent
	2	+++	+++	++	No history
	10	+++	++++	+	
	3	++	++++	+	
	2	++	+++	+++	Thorough
	2	++	++++	—	Thorough
	2	++	±	±	Indifferent
	3	++	—	—	Thorough
	1	++	±	—	Thorough
	1	—	++	—	Thorough
	3	—	++++	—	
	1	—	++++	—	
	1	—	++++	—	No history
	1	—	++++	++	No history

Nonsyphilitic Control Serums.—It is worthy of note that in the examination of almost 2,000 nonsyphilitic control serums, not one four plus reaction was obtained. This fact speaks strongly for the specificity of the Kahn test, which phase of the study we hope to report on in a forthcoming communication. In Cases 1 and 2, the patients had acne vulgaris and plantar wart, respectively, and no additional evidence of syphilis could be obtained.

Case 3 was one of pityriasis rosea which promptly involuted. Up to the present time, the patient has shown no clinical or serologic evidence of syphilis.

TABLE 7.—*Congenital Syphilis*

	Number of Cases	Kahn Reaction	Wassermann Reaction Cholesterinized Antigen		Treatment
			18-Hour Fixation Icebox	1-Hour Fixation Icebox	
Agreement.....	24	++++	++++	++++	
	4	—	—	—	Well
Divergence.....	1	++++	++++	++	No history
	1	++++	++++	+	Thorough
	1	++++	++++	—	Thorough
	1	++++	—	++++	Thorough
	2	+++	+++	++	Thorough
	1	+++	+	—	Thorough
	1	++	±	±	Thorough
	1	+	±	±	Thorough
	1	+	—	—	No history
	1	—	++++	—	Thorough

TABLE 8.—*Nonsyphilitic Control Serums*

	Number of Cases	Kahn Reaction	Wassermann Reaction Cholesterinized Antigen		Diagnosis
			18-Hour Fixation Icebox	1-Hour Fixation Icebox	
Agreement.....	1,970	—	—	—	
Divergence.....	1	+	—	—	Acne vulgaris
	1	++	—	—	Verruca plantaris
	1	+	±	—	Pityriasis rosea
	1	++	—	—	Epithelioma
	1	—	++++	—	Tonsillitis

In Case 4, the patient was an elderly man who consulted the clinic for treatment of an epithelioma of the face. One year before, he had a two plus Wassermann reaction. Several examinations since that time failed to convince us that the patient was syphilitic. However, in the light of the previous complement-fixation test, we may, in this case, not be dealing with a false positive reaction.

Case 5 was that of a young woman who entered the hospital for a tonsillectomy, and who on routine examination was found to have a strongly positive Wassermann reaction. We have been unable to find any clinical evidence of syphilis in this case.

It should be stated that the same dermatologic conditions as those giving the several apparently nonspecific Kahn reactions noted in Table

8 did not give positive reactions in other cases. This suggests the possibility of technical errors, such as improper checking of the serum controls for the presence of serum particles, rather than serologic factors.

THE METHOD

Preparation of Antigen.—About 500 gm. of muscle, cut from three or more beef hearts are passed four times through a meat chopper. The finely ground material is spread in a thin layer on a glass plate or porcelain platter and dried by a current from revolving fans. When the surface is sufficiently dry, after about six hours, the material is broken up into small pieces and drying continued until the particles are crisp and easily breakable. The product is finally ground into powder form by means of a mortar. It is then ready for extraction.

In the tests reported in this paper, antigen was prepared according to the recently standardized method. Bacto Beef Heart, obtained from the Digestive Ferments Company, of Detroit, was employed. The unit of extraction was always 25 gm. of the powder in a 250 c.c. Erlenmeyer flask. When large quantities of antigen were prepared, as many 25 gm. quantities were employed as needed. The ether extraction consisted of four separate washings at ten-minute intervals as follows: (1) Twenty-five grams powdered beef heart were placed in a 250 c.c. Erlenmeyer flask and 100 c.c. ether (anesthesia) added. After keeping the powder in suspension for ten minutes by shaking, the mixture was filtered through filter paper. Pressure was exerted with a spatula on the beef heart, and the filtration was considered complete when no more ether dropped from the funnel. The powder was returned to the flask, the ether being either discarded or saved for redistilling. (2) Seventy-five cubic centimeters ether were added to the moist powder and the mixture shaken for ten minutes. The mixture was filtered as in (1), and the powder was returned to the flask. (3) Seventy-five cubic centimeters ether were again added to the moist powder, the mixture shaken for ten minutes and filtration carried out as in (1). The powder was again returned to the flask. (4) For the last ether extraction period, 75 c.c. ether were added to the moist powder and the mixture shaken for ten minutes. After filtering as in (1), the powder was spread on clean white paper and dried for a period sufficient to remove all trace of the odor of ether. About fifteen minutes were required at incubator temperature or a little longer at room temperature. The dry powder was reweighed and returned to the 250 c.c. flask, which had been thoroughly dried. Five cubic centimeters of 95 per cent. alcohol were added for each gram of powder. (There was usually a loss of about 2 gm. of powder per twenty-five grams during the ether extraction.) After adding alcohol, the mixture was shaken for ten minutes and

then left to extract at room temperature (21 C.) without shaking, for three days. At the end of this period, the mixture was shaken for five minutes and filtered through filter paper. The alcoholic extract thus obtained was stored at room temperature in the dark as stock solution. Cholesterin was added to an amount of alcoholic extract sufficient for about two months' use—6 mg. cholesterin per cubic centimeter of extract. All flasks used for the preparation or storing of antigen were stoppered with tin foil covered corks.

Titration of Antigen.—The aim of this titration is to determine in what proportions to dilute antigen with salt solution for the tests. Technically, it is to determine the smallest amount of physiologic salt solution which, added to antigen, will produce a precipitate capable of dissolving on further addition of salt solution. The procedure employed was as follows: (1) One cubic centimeter of cholesterinized antigen was added to each of five standard antigen dilution tubes (5.5 cm. length, 1.5 cm. diameter). (2) To five similar tubes were added 0.8,

TABLE 9.—*Three Tube Test for Determining Whether or not Precipitate in each Antigen Dilution is Soluble* *

	Tube 1, C.c	Tube 2, C.c.	Tube 3, C.c.
Antigen dilution	0.05	0.025	0.0125
Normal saline	0.15	0.15	0.15

* Tubes were shaken vigorously for two minutes (in shaking machine). After adding 0.5 c.c. normal saline to each tube, all were observed for precipitates.

0.9, 1.0, 1.1, 1.2 c.c. physiologic salt solution, respectively. (3) Five antigen dilutions were prepared by mixing the 1 c.c. quantities of antigen with the varying amounts of salt solution, in series. The salt solution was mixed with the antigen in each case by pouring the salt solution into the antigen as rapidly as possible (without waiting to drain the tube) and pouring the mixture back and forth five or six times. The five antigen-saline dilutions were permitted to stand for thirty minutes at room temperature before testing the solubility of the precipitates present in each. (4) The solubility of the precipitate in each antigen dilution was tested in physiologic salt solution as follows: (*a*) Into three of the standard tubes employed in performing the regular test with serum (7.5 cm. length, 1 cm. diameter) were pipetted 0.05, 0.025 and 0.0125 c.c. quantities, respectively, of a given antigen dilution, delivering these quantities to the bottom of the tubes with a 0.2 c.c. pipet marked in 0.001 c.c. (*b*) With a 1 c.c. pipet, 0.15 c.c. quantities of physiologic salt solution were added to the three tubes. (*c*) The tubes were shaken vigorously for two minutes (in a shaking machine). (*d*) Five-tenths cubic centimeters physiologic salt solution were added to each tube, and all examined for precipitates.

When each of the five antigen dilutions were thus tested for the solubility of the precipitates by means of the three tube test, it was usually found that the antigen dilutions prepared by mixing 1 c.c. antigen and 0.8 or 0.9 c.c. physiologic salt solution contained precipitates which were insoluble in salt solution, whereas the three remaining antigen dilutions, each containing 1 c.c. amounts of antigen and 1, 1.1, and 1.2 c.c. salt solution, respectively, contained precipitates which were soluble in salt solution. The antigen dilution containing the smallest amount of salt solution having a precipitate which was soluble in salt solution, as indicated by the three tube test, represented the titer of the antigen. If, for example, the three tube test indicated that 1 c.c. amounts of antigen diluted with either 1, 1.1 or 1.2 c.c. salt solution contained precipitates which were soluble in salt solution, then the titer of the antigen was 1 + 1; that is, 1 c.c. antigen was diluted for the tests with 1 c.c. salt solution, 2 c.c. antigen with 2 c.c. salt solution.

Serum.—The serums were prepared for the test in the usual manner. Chylous and hemolyzed specimens, when hemolysis was not excessive, gave no difficulty. Particular care was taken to free the serums from corpuscles, strings of fibrin and all other particles. The serums were heated for thirty minutes at 56 C. before using.

Physiologic Salt Solution.—Physiologic salt solution was prepared by adding 8.5 gm. chemically pure sodium chlorid to 1,000 c.c. distilled water. Chemical purity but not sterility was adhered to in the employment of this solution.

PERFORMANCE OF TEST

Preparation of Standard Antigen Dilution.—(1) One cubic centimeter standard cholesterinized antigen was added to a standard antigen dilution tube (5.5 cm. length, 1.5 cm. diameter), and the amount of physiologic salt solution indicated by titration was added to a similar tube. (Titer of antigen used was practically always 1 c.c. antigen plus 1 c.c. salt solution. Occasionally the titer was 1 plus 0.9 or 1.1 c.c. salt solution.) When examining a large number of specimens, 2 or 3 c.c. of antigen were diluted with salt solution, using the same standard antigen dilution tubes. (2) In making the dilution, the salt solution was poured into the antigen, and as rapidly as possible (without waiting to drain the tube) the mixture was poured back and forth five or six times. For uniformity, this standard antigen dilution was allowed to stand ten minutes before using and was employed in the tests within half an hour after diluting the antigen with salt solution. (3) As a preliminary control of the proper mixing of antigen and salt solution, 0.05 c.c. of the diluted antigen was measured into a tube and 1 c.c.

salt solution added. If, after shaking vigorously for fifteen seconds, the mixture appeared opalescent, it was considered satisfactory for use in tests.

Procedure of Test.—(1) Antigen dilution in 0.05, 0.025 and 0.0125 c.c. quantities, respectively, was pipetted into three tubes (7.5 cm. length, 1 cm. diameter) with a 0.2 c.c. pipet marked in 0.001 c.c.—delivering to the bottom of the tubes. (2) Fifteen hundredths cubic centimeters clear inactivated serum was added to each of the three tubes with a 1 c.c. pipet graduated in 0.01 c.c. Antigen dilution and serum were mixed thoroughly. (3) The tests were shaken vigor-

TABLE 10.—*Outline of Kahn Test and Interpretation of Results*

	The Test			
	Tube 1	Tube 2	Tube 3	Completion of Test
Serum: Antigen dilution	3:1	6:1	12:1	Tubes shaken two minutes, 0.5 c.c. salt solution added to each tube and results read
Antigen dilution	0.05 c.c.	0.025 c.c.	0.0125 c.c.	
Serum (heated at 56 C. for 30 minutes)	0.15 c.c.	0.15 c.c.	0.15 c.c.	

	Interpretation of Results			
	Reaction No.				Final Result (Average of Reactions of Three Tubes)
Some Typical Reactions	1	++++	++++	++++	++++
	2	+++	++++	++++	
	3	++	++++	++++	+++
	4	+	+++	++++	
	5	—	+++	++++	++
	6	—	++	++++	
	7	—	±	++++	+
	8	—	—	+++	
	9	—	±	++	±
	10	—	—	—	—

ously for two minutes. (4) Five tenths cubic centimeter of salt solution was added to each tube, and the tests were read within approximately five minutes. (5) In some of the tests, a fifteen minute incubation period in the water bath was employed immediately after the two minute shaking period and prior to the addition of 0.5 c.c. salt solution to each tube for reading. Such incubation was not found to give false reactions, and in some cases rendered the reading of results somewhat easier. (6) Readings were made in front of a window with a darkened background. The negative and strongly positive reactions were easily read without removing the tubes from the racks. In the case of the weaker reactions, each tube was lifted from the rack considerably above the level of the eye, slanted to spread the fluid into a thin layer and examined for a precipitate.

Controls for Each Series of Tests.—1. Antigen Control: When pipetting antigen dilution for a series of tests, the last set-up of 0.05, 0.025 and 0.0125 c.c. amounts received 0.15 c.c. salt solution instead of serum, and was included with the regular tests. It was required that all three tubes show freedom from a precipitate at the time of reading the tests. 2. Serum Control: Each serum was examined for particles which might give the appearance of a specific precipitate. No positive reaction was recorded until it was determined that the serum used in the test was entirely clear. 3. Positive and Negative Controls: One or more such controls were included with each series of tests.

Interpretation of Results.—The results were read on the basis of one, two, three and four plus, depending upon the distinctness of the precipitate. A distinct precipitate suspended in a clear medium was considered four plus. Precipitates of lesser intensity were read three, two or one plus, respectively. The average of the readings of the three tubes was considered the final result. Thus, if each of the three readings was four plus, the final reaction was four plus; if the three readings were negative, three and four plus, respectively, the final reaction was considered two plus.

CONCLUSIONS

The diagnostic value of the Kahn precipitation test for syphilis was studied in 2,600 cases in comparison with two Wassermann tests—one highly sensitive and one more conservative in character—with the following results:

1. In primary syphilis (twenty-five cases), the Kahn test was found slightly more sensitive than either of the two Wassermann tests.

2. In secondary syphilis (sixty-four cases), there is agreement in the three methods.

3. In tertiary syphilis, excluding cerebrospinal (eighty-seven cases), the Kahn test was found slightly more sensitive than both Wassermann tests except that in visceral syphilis it compared with the more sensitive Wassermann test.

4. In cerebrospinal syphilis (192 cases), the reactions with the Kahn test fall about midway between the highly sensitive and conservative Wassermann tests.

5. In latent syphilis (218 cases), the reactions with the Kahn test compare favorably with the reactions with the long icebox fixation Wassermann test.

6. In congenital syphilis (thirty-nine cases), the Kahn test is slightly more sensitive than either of the two Wassermann tests.

7. In nonsyphilitic controls (1,975 cases), the Kahn test gave two one plus reactions and two two plus reactions in dermatologic conditions apparently nonsyphilitic.

STABILITY OF DESICCATED BEEF HEART MUSCLE POWDER FOR PREPARATION OF ANTIGENS FOR CONDUCT OF COMPLEMENT-FIXATION TESTS IN SYPHILIS

WITH SPECIAL REFERENCE TO THE KOLMER METHOD *

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LOS ANGELES

Since the discovery that "antigen" extracts for the conduct of complement-fixation tests in syphilis need not be made from spirochetae-containing syphilitic organs, and that alcoholic extracts of indifferent and nonsyphilitic organs or tissues were not only quite suitable but, in fact, superior for the purpose, a great deal of time and study have been devoted to the determination of what constitutes the most satisfactory extract.

The merits and demerits of the numerous technical modifications introduced by various workers into the technic of the complement-fixation test in syphilis are surrounded and involved in a maze of discussion, but if there is any one point on which serologists may be found in entire and unanimous accord, it is on the essential and vital necessity for the use of a suitable antigen. On this one factor and this single reagent, the delicacy, reliability and specificity of the reaction are in no small measure dependent.

The relative value and usefulness of the various extracts proposed and in common use have been thoroughly studied in a comprehensive summary of the subject by Kolmer and Trist,[1] who sum up the question in the opening paragraphs of their paper as follows:

> Probably the most constant factor influencing the results and practical value of the complement-fixation test in syphilis concerns the kind of organ extract employed as "antigen." In our opinion the divergent Wassermann reactions observed in different laboratories with portions of the blood of the same person have been due in part to differences in antigens employed, referable not only to difference in kind, but to dosage as well.

This question is intimately concerned with and forms an integral part of attempts to elaborate a standard and uniform method for the performance of complement-fixation tests in syphilis, in which great interest is, at present, aroused, for, obviously, the attempt to evaluate

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* Preliminary Report.

1. Kolmer, J. A., and Trist, M. E.: A Comparative Study of Tissue Extracts (Antigens) and Methods of Preparation, Am. J. Syph. **6**:2 (April) 1922.

the relative merits of one or more methods varying in one or more technical details, may be markedly influenced without regard to the technical manipulations by the character of the antigen extract employed. Moreover, a method giving good results with one antigen may either far surpass or greatly fall short of these results when varying antigens are used, the other technical conditions remaining the same.

It is not my purpose to discuss the relative value of the various antigens in common use, but to consider only a single factor concerned with their preparation.

It is apparent that the substance, tissue and organ most widely used and most eminently suitable for the preparation of antigen extracts is heart muscle—either beef or human.

While the results of some investigations have apparently demonstrated that human heart muscle is more suitable than beef heart muscle for the preparation of antigen extracts, practical experience has demonstrated that satisfactory and suitable extracts may be prepared from beef heart muscle with a greater and more constant degree of success and uniformity than from human heart muscle.

QUALITIES OF A SATISFACTORY ANTIGEN

The reasons for this are developed in the consideration of the qualities requisite for a satisfactory antigen.

In the extraction of muscle tissue by alcohol or ether, while the main purpose of the procedure is the extraction in solution of the lipoidal bodies which are now known to confer on the extract its antigenic properties, various other substances are also extracted, and go into simultaneous solution to a greater or less degree, which markedly influence and affect the ultimate value and suitability of the extract for use in the complement-fixation test for syphilis. Some of these substances are capable of producing nonspecific hemolysis and others in various ways not yet clearly understood, exercise a greater or less deterrent action on the activities of complement.

To be satisfactory, therefore, an antigen extract should fulfil the following desiderata:

1. It must not be highly hemolytic.
2. It must not be highly anticomplementary and should, preferably, possess this property only to a slight degree.
3. It must be highly antigenic.

Various investigations have shown conclusively that any one or all of these properties may be affected and modified by conditions extraneous to the actual extraction of the tissue and referable to its physical state. It is important, for example, that the heart muscle be fresh and free

from the products of decomposition and autolysis, as these substances have been shown definitely and even enormously to increase the anti-complementary and hemolytic titer of the resultant extract.

The difficulty, therefore, of obtaining human hearts in a fresh and unaltered condition definitely affects their general suitability for antigen preparation. As long as the extact nature of the lipoidal bodies on which the antigenic action of an extract depends remains unknown, there is always the theoretical and problematical possibility of their change, alteration or replacement by others of varying composition and antigenic value by virtue of the biochemical processes allied to or forming a part of pathologic conditions, the extent, character, and occurrence of which will always be uncertain in the human hearts available.

As every human heart available for antigen preparation must come from the postmortem room; as practically every such heart must be obtained from bodies ravaged by disease processes; and as all will have been subjected to the processes contingent on cellular death and autolysis to a varying and immeasurable degree, these factors, not to mention the uncertain quantity of the supply, in conjunction with the fact that beef heart muscle is extremely well suited to the preparation of antigen extracts, have led to its almost universal use for the purpose.

Beef heart muscle may be obtained immediately after death; it may be obtained in any desired amount; and any desired number of hearts may be mixed prior to extraction.

One of the most important qualities necessary in a suitable antigen is polytropicity; in other words, the extract should possess affinity for the lipoidophilic antibodies in the serums of *all* syphilitic persons; hence the extract must contain as many varieties of extractable lipoidal substances as possible.

While this property may be conferred in marked degree by the addition of cholesterin to the finished extract, it is also and, perhaps, better achieved by the commingling of as many different organs as possible for extraction.

This mixture of various heart muscles in greater or smaller numbers is far more possible with beef than with human hearts, and also explains to some degree the relative and divergent values of antigens prepared by different workers all using beef heart muscle, and even by the same worker on different occasions.

Regardless of the character of the finished antigen extract, whether it be a plain alcoholic extract or cholesterin-reinforced, an extract of acetone-insoluble lipoids, or, as Kolmer has suggested,[2] a combination

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2. Kolmer J. A.: A Superior Antigen for Complement-Fixation Tests in Syphilis (A Cholesterolized and Lecithinized Alcoholic Extract of Heart Muscle), Am. J. Syph. **6**:1 (Jan.) 1922.

of all three, it is obvious that, were it possible for various workers to use in the preparation of their antigens, a beef heart muscle of uniform quality and polytropicity, a definite step toward uniformity would have been made, and at least one common basis for the comparison of results obtained.

USE OF DRIED HEART MUSCLE

The discovery that *dried* heart muscle could be utilized for antigen preparation made such uniform conditions theoretically possible, and the commercial preparation of such a dried beef heart muscle in powder form following the publication of Kolmer's new method of antigen preparation made the possibility an actuality.[3]

The product possesses the following advantages:

1. It is polytropic to an extraordinary degree far beyond the degree possible in "home-made" products, being prepared from 500 (227 kg.) to 1,000 pounds (454 kg.) of fresh beef heart, muscle, and thus combining a large number of hearts.

2. It is practically free in large measure from extractive products of tissue decomposition and autolysis, being prepared from freshly procured hearts.

3. It is practically entirely devoid of moisture, which contributes to the efficiency with which it may be extracted by lipoid solvents.

4. It is finely powdered, thus offering a relatively enormous area for extracting and so contributing to the practically complete extraction of lipoidal substances.

5. It facilitates and makes possible the use of mixtures of muscle from a large number of hearts.

6. Such polytropic powders may be kept on hand for use as desired.

A preparation of this kind, therefore, offers a convenient means for a uniform starting point for the preparation of antigen extracts regardless of the nature or character of the finished product desired, and, under these circumstances, it seemed of interest to determine whether or not such a preparation commercially prepared would be of stabile character.

It is obvious that though conditions of marked uniformity might be developed and maintained in the process of manufacture, unless it were possible to store and keep the finished product without perceptible changes or alterations, its apparent uniformity would be actually fallacious, and uniform or comparable results from its use could not be expected.

The purpose of the investigation was not to determine whether such a commercially prepared beef heart powder could be utilized for the preparation of antigens, for that has been demonstrated and the product

3. This preparation is marketed by the Digestive Ferments Co. of Detroit, Michigan under the name of "Bacto Beef Heart, Dehydrated."

has been in actual use for the preparation of extracts according to the method of Kolmer and also that of Kahn for the conduct of flocculation tests in syphilis; the object in view was to determine the relative stability of the powder and its suitability for antigen preparation after varying periods of time.

Such an investigation seemed to be of practical interest and importance for several reasons: If the powder was not stabile under ordinary conditions of storage, this fact would have a direct connection with its polytropicity, for in the preparation of large amounts as resulting from the use of a large number of hearts, either a large amount of the finished product would be wasted and eventually discarded, or else the product would have to be manufactured in smaller lots and from smaller numbers of hearts.

Again, if of unstabile character, the finished product would have to be made frequently, with a consequent direct effect on the expense of manufacture and the ultimate cost to the consumer; also, only small quantities for relatively immediate use could be kept on hand, and thus much of the convenience of such a preparation would be lost.

The investigation was undertaken, therefore, for these and other reasons, among which may be noted the value of such a preparation for the uniform preparation of antigens by different workers or by central stations for distribution to sublaboratories and the like.

The salient features of the preparation of the powder may be mentioned with interest and, from information furnished by Mr. Dunham, director of bacteriologic laboratories of the Digestive Ferments Company, are as follows:

By means of liaison between the abattoir and the laboratory, arrangements are made whereby the hearts may be collected under direct supervision immediately on the slaughter of the animals, and immediately delivered to the laboratory.

They are transported in relatively small numbers at frequent intervals, so that the time elapsing between their removal from the animal and delivery to the laboratory is reduced to a minimum. Each lot of heart powder is prepared from a mixture of not less than 500 pounds of beef hearts, or an average of 150 hearts.

On their receipt in the laboratory, each heart is carefully trimmed of fat and blood vessels by an especially trained attendant, and the heart muscle remaining is thoroughly washed in cold water until all traces of blood have been removed, particular care being given to this point. The washed muscle is then put through a meat grinder three times, each time being reduced to a finer mixture, until a fine and evenly mixed paste is secured.

This muscle paste is then dried at once at a very low temperature controlled by a thermostat in a vacuum of 28 inches (71 cm.) or above.

As all these steps are performed on successive lots of hearts freshly removed and frequently delivered to the laboratory, tissue changes due to decomposition or tissue autolysis are practically impossible.

After desiccation in vacuo, the dried muscle is then powdered until it will pass through a sieve having 100 meshes to the inch, and the powders thoroughly mixed, the final mixture constituting the finished product.

Such a product is of uniform character and eliminates the individual element in its preparation, thus enabling all workers using it for antigen preparation to start with identical raw material.

PREPARATION AND TITRATION OF ANTIGENS

The plan of the investigation was as follows:

A supply of the heart powder was secured from Mr. Dunham, being a part of one lot manufactured under date of July 3, 1923, and bearing the lot number 11631. Part of this supply was in a bulk one pound, glass, cork-stoppered bottle; the remainder was in cork-stoppered and paraffined glass bottles each containing 25 gm. From this supply, antigen extracts were made at various periods, and the titrations compared.

All antigens were made in exact accordance with the method described by Kolmer,[2] because the extraordinary delicacy, high antigenic value, and low hemolytic and anticomplementary titer of this extract rendered it suitable for the detection of even slight variations in the properties of different extracts similarly prepared, and because the quantitative complement-fixation test described by Kolmer [4] was adopted some time ago as the routine method of choice, and the antigens could, therefore, be put to routine use.

No special effort was made to safeguard the powder other than to keep the containers tightly stoppered to avoid the absorption of moisture, the bottles being allowed to stand on the laboratory shelves.

Immediately on the receipt of the powder, an antigen was prepared and titrated on Sept. 7, 1923, the powder then being two months old.

The titration gave the following result: antigen I-E (age of powder: 2 months); hemolytic: 0.5 c.c. of 1:5; anticomplementary 0.5 c.c. of 1:6; antigenic: 0.5 c.c. of 1:8,000; dose: 0.5 c.c. of 1:800.

In Kolmer's method of antigen titration of his extract, the dilutions are, as a routine, carried out to 1:2,400. With this extract, the dilutions were carried out to 1:4,000, in which dilution complete fixation was

4. Kolmer, J. A.: A New Complement-Fixation Test for Syphilis Based Upon the Results of Studies in the Standardization of Technic, Am. J. Syph. **6**:1 (Jan.) 1922.

obtained with 0.5 c.c. of a 1 : 10 dilution of a mixture of several strongly positive serums; a further dilution was then made, and the ultimate antigenic unit found to be 0.5 c.c. of 1 : 8,000.

Accustomed as one becomes to antigenic titers of remarkable degree with antigens prepared according to Kolmer's method, this was really extraordinary, but the titration was carefully checked and controlled and several times repeated, with identical results.

On Sept. 3, 1923, a second antigen was finished and titrated, with the following result: antigen II-E (age of powder, 5 months); hemolytic: 0.5 cc. of 1 : 4; anticomplementary: 0.5 c.c. of 1 : 6; antigenic: 0.5 c.c. of 1 : 2,400; dose, 0.5 c.c. of 1 : 240.

The original titration of this second extract gave an antigenic unit of only 0.5 c.c. of 1 : 600. This was surprising and even inexplicable, as considerable experience in the preparation of Kolmer antigens had led to a confident expectation of always securing an extract titering at least 1 : 1,200. The only possible explanations were either that the powder had undergone a remarkable degree of deterioration, or that, because of variable factors in the technical features of the titration, the resultant unit did not represent the true value of the extract.

Variable features which may give discordant results which are fallacious in the titration of antigen extracts are variations in complement activity through deterioration or inherent deficiencies in fixability, and variations in the reagin content of the serums used for the titration.

The complement used was preserved in accordance with the method described by Kolmer in his quantitative test (0.3 gm. sodium chlorid to 1 c.c. of serum), and though not over ten days old, might conceivably have undergone some change, although this was not probable. More probable was the possibility that there had been deterioration in the strength of the positive serum mixture.

This extract was, accordingly, retitrated in the next few days with the same complement, using, however, a fresh mixture of positive serums, and then gave an antigenic unit of 1 : 2,400.

This experience demonstrated the necessity or advisability of using preferably relatively fresh positive serums for antigen titrations rather than serums which, though kept in the cold and which had remained sterile, had been subjected to repeated inactivations.

It is of interest here to consider the marked divergence of the antigen extracts prepared from the powder when 2 and 5 months old. At first glance, the logical assumption would be that the powder had undergone some evident deterioration. It is obvious, however, that the efficiency of an extract is directly dependent on the thoroughness with which it is extracted.

In the preparation of the first antigen, it was noted that the extreme and almost impalpable fineness of the powder caused it to have a

tendency to settle firmly on the bottom of the bottle in a fairly compact mass, the solvent appearing to lie largely on the surface of this matted powder. During the first extraction, therefore, the bottle was shaken rather more frequently than had been previously customary with home-made powders of coarser texture, with the evident result that extraction was extremely thorough and complete. In the preparation of the second and subsequent extracts, however, no particular pains were taken in this respect, it being desired to ascertain what would be the result under ordinary and usual conditions. The difference in the antigenic units, therefore, is held to be due more to variations in the frequency of agitation and consequent thoroughness of extraction than to variations in the powder per se.

A third antigen, titrated, Jan. 5, 1924, gave the following result: antigen III-E (age of powder, 7 months); hemolytic: not in 0.5 c.c. 1:4; anticomplementary: 0.5 c.c. 1:10; antigenic: 0.5 c.c. 1:4,000 (titration not carried higher); dose: 0.5 c.c. 1:400 (10 units). A fourth antigen titrated, March 21, 1924, possessed the following qualities: antigen IV-E (age of powder, 9 months); hemolytic: 0.5 c.c. 1:4; anticomplementary: 0.5 c.c. 1:6; antigenic: 0.5 c.c. 1:4,000 (titration not carried higher); dose: 0.5 c.c. 1:400. A fifth antigen, titrated, May 27, 1924, gave the following result: antigen V-E (age of powder, 11 months); hemolytic: 0.5 c.c. 1:4; anticomplementary: 0.5 c.c. 1:10; antigenic: 0.5 c.c. 1:4,000; dose: 0.5 c.c. 1:400. The results of the titrations are graphically shown in the charts.

Reference to the titration data and to the charts suffices to demonstrate that the primary purpose of the investigation—to determine whether the beef heart powder was sufficiently stabile under ordinary conditions of storage to prove suitable for the preparation of satisfactory and effective antigens over relatively extended periods—was achieved, and that the query could be answered in the affirmative.

Though all of the antigens prepared were eminently well suited by titer for the conduct of complement-fixation tests in syphilis and quite comparable and even superior to extracts made from home-made, and, therefore, relatively fresh dried heart muscle, it will be noted that there was some difference in the antigenic units obtained with the different extracts. The difference between the first and second antigens in this respect has been previously commented on and, it is believed, accounted for, and the explanation of the minor variations in subsequent extracts may be logically deduced.

There are several factors influencing the antigenic titration, among which may be noted the varying fixability of different complements, the variations in the reagin content of the positive serums, and the variable degree of thoroughness with which the lipoidal substances responsible for the antigenic properties have been extracted. This last is, undoubtedly, the factor of greatest importance.

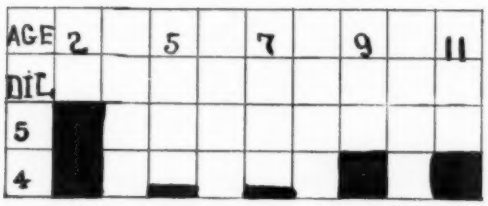

Chart 1.—Hemolytic titrations. The dose of antigen was 0.5 c.c. of the dilutions indicated. The age is the age of the heart powder in months; *dil.* indicates dilution of antigen.

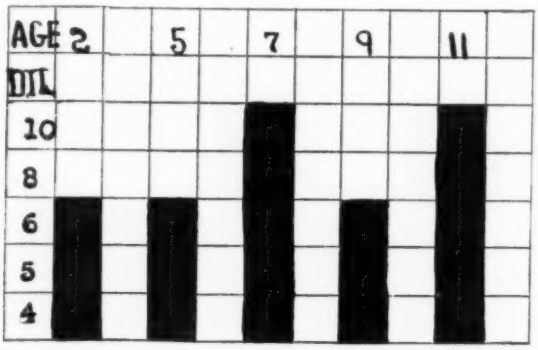

Chart 2.—Anticomplementary titrations.

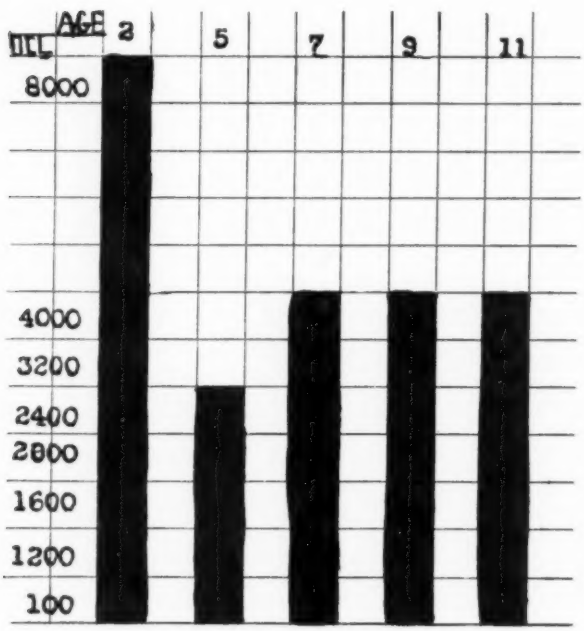

Chart 3.—Antigenic titrations

Varying degrees of thoroughness of extraction may be influenced by variations in the strength of the alcohol used (Kolmer's method uses 95 per cent. ethyl alcohol), and, what is obviously an important factor, the thoroughness with which the admixture of the heart muscle and the solvent is achieved and maintained.

Reference has been made to the tendency of the beef heart muscle powder because of its fineness to settle in a rather dense mass and to the possibility, in spite of the large area exposed to extraction, that, unless the container were frequently shaken, extraction might be mechanically impeded. To test this point and to determine whether or not a powder not quite so fine and so, when layered, presenting interstices through which the solvent might easily percolate, might not be of equal if not greater efficiency, through the courtesy and cooperation of Mr. Dunham a series of powders of varying degrees of fineness was prepared and tested.

Powder No. 1 was of coarse texture, not passing through a 16 mesh to the inch sieve; No. 2 was of a texture passing through a 16 mesh but not through a 20 mesh sieve; No. 3 was held back by a 40 mesh but passed through a 20 mesh sieve; and No. 4 was of the same fineness as usually prepared—practically impalpable. No 3 and No. 4 were used to prepare antigens under identical conditions with the following results: antigen from No. 4 (fine powder); hemolytic: 0.5 c.c. of 1:5; anticomplementary: 0.5 c.c. of 1:4; antigenic: 0.5 c.c. of 1:2,400 (titration not carried higher); dose: 0.5 c.c. of 1:240. Antigen from No. 3 (coarse powder); hemolytic: 0.5 c.c. of 1:5; anticomplementary: 0.5 c.c. of 1:4; antigenic: 0.5 c.c. of 1:1,000; dose: 0.5 c.c. of 1:100.

It is apparent, therefore, that while the extraction of the hemolytic and anticomplementary substances was about the same in each powder, the finer powder, even without undue frequency of agitation, gave a more thorough extraction of the antigenic lipoidal substances and an extract with an antigenic unit approximately two and one half times as great as that secured with the coarser powder, this being due entirely to the greater area exposed to extraction.

It may be noted that all the antigens reported on were made from the powder contained in the 25 gm. containers. When the powder was 5 and 11 months old, however, antigens were likewise made from the powder in the bulk 1 pound container with strictly comparable results, the antigenic units being about the same.

One ounce samples of the finished and titrated antigens were put aside from each lot for titration at subsequent intervals to test the keeping qualities of the finished extracts. The unused powder was likewise set aside to be tested at intervals in the future to ascertain, if possible, the ultimate limit of its stability. The results of these determinations will be reported in a subsequent communication.

SUMMARY

An investigation, the results of which are herewith reported, was conducted to determine the relative stability of a commercially prepared dried and powdered beef heart muscle powder intended for the preparation of antigens for the conduct of complement-fixation tests in syphilis.

CONCLUSIONS

The results of the investigation suffice to demonstrate that:

1. A highly polytropic powder of beef heart muscle can be commercially prepared in large quantities.

2. Such a product is eminently suitable for the preparation of highly antigenic extracts with low hemolytic and anticomplementary titers according to Kolmer's method of antigen preparation.

3. The powder under ordinary conditions of storage is quite stabile, satisfactory antigens having been prepared from it after eleven months.

4. No special precautions in keeping the powder are required other than to keep the containers tightly stoppered to prevent the absorption of moisture.

5. If the precaution is taken to shake the container *frequently* and vigorously during extraction, antigens of remarkable potency may be prepared; without special care, the extracts are highly antigenic and quite satisfactory.

6. Beef heart muscle powder may be commercially prepared and stored in large quantities for at least eleven months without fear of undue deterioration.

RELATION OF NATURAL ANTISHEEP HEMOLYSIN OF HUMAN SERUMS TO KOLMER'S QUANTITATIVE COMPLEMENT-FIXATION TEST FOR SYPHILIS

ROBERT A. KILDUFFE, M.D.

LOS ANGELES

The presence of natural antisheep amboceptor in human serums in perceptible and even at times large amounts has been demonstrated by numerous investigators, and its relation to the use of an antisheep hemolytic system in the performance of complement-fixation tests for syphilis has been widely commented on.

While there are many who feel that the quantitative relations of an antisheep hemolytic system are so gravely disturbed by the frequent presence of unknown amounts of natural antisheep hemolysin in the serum to be tested as to interfere with the detection of small amounts of syphilitic reagin, and who, therefore, deem their removal a prerequisite for the performance of the test, there are also those who feel that the question has, perhaps, a greater theoretical than practical importance.

The literature concerning the question is rather voluminous, and many authorities can be cited on both sides of the question.

The conclusions to be drawn from various investigations in this field are influenced to a greater or less extent by the various factors of technic involved, such as the size of the test dose of serum, complement and amboceptor employed; the character and duration of the primary incubation period; and the time at which the final reading is made—whether at once or after standing some hours or over night.

These and other factors have been studied and commented on by Kolmer and Rule,[1] who, as a result of their studies, conclude that:

1. The coincident presence of large amounts of natural antisheep hemolysin in a serum containing large amounts of reagin is without effect on the detection of a positive reaction; and that, although absorption of such serums might, at times, result in obtaining a slightly stronger reaction, the result without absorption was not in doubt.

2. While the coincident presence of large amounts of hemolysin and large amounts of syphilitic reagin failed to affect the results of

1. Kolmer, J. A., and Rule, J. A.: The Influence of Natural Antisheep Hemolysin in Human Sera Upon the Wassermann Test, Am. J. Syph. **4**:1 (Jan.) 1920.

the test, the coincident presence of large amounts of hemolysin and small amounts of reagin may have a profound effect on the results of the test.

This being the case, for practical purposes the removal of the natural antisheep hemolysin before the performance of the test becomes more or less a matter of personal preference; for, while a great deal of reliance may be placed on a strongly positive reaction when properly performed, checked and controlled, by no means the same certainty for diagnostic purposes attaches to those serums giving weakly positive reactions with methods in ordinary use unless the findings are correlated with and substantiated by the history and available clinical data, or the case is under treatment—for the serologist must not lose sight of the fact that, while it is his duty, aim and endeavor to detect all the cases of syphilis possible, it is also his equal duty and should be his equal aim and endeavor to protect nonsyphilitic persons from unnecessary treatment.

In the last analysis, it is not the test but the interpretation of the test that has significance. Even if, because of the presence of large amounts of antisheep hemolysin, weakly positive serums gave a false negative reaction, the abandonment of syphilis as a diagnostic possibility or the cessation of treatment or observation should not be allowed to rest on the sole basis of a single serologic examination.[2]

The results reported by various and numerous workers with the quantitative complement-fixation method described by Kolmer[3] have been such as to demonstrate for this technic a remarkable degree of delicacy and specificity, so much so that a considerable degree of reliance may be placed on positive reactions obtained with it as indicative of the presence of syphilitic reagin. Not only have all workers with the method found it uniformly negative in all the conditions in which, by other methods in vogue, false positive reactions have been obtained, but the results of critical and extensive investigations have shown that in every instance in which a definitely positive reaction has been obtained, further evidence corroboratory of the specificity of the reaction invariably has been demonstrated.

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2. Kilduffe, R. A.: The Status of the Negative Wassermann Reaction, J. A. M. A. **79**:2215 (Dec. 30) 1922; The Status of the Complement-Fixation Test in Relation to the Cure of Syphilis, Arch. Dermat. & Syph. **10**:62 (July) 1924; Concerning the Diagnosis and Treatment of Syphilis, Am. J. Syph. **8**:142 (Jan.) 1924.

3. Kolmer, J. A.: A New Complement-Fixation Test for Syphilis Based Upon the Results of Studies in the Standardization of Technic, Am. J. Syph. **6**:1 (Jan.) 1922.

So constant and invariable have these findings been that it seems probable that future experience will demonstrate that a positive reaction by this technic may be confidently taken as specific for syphilis, with the single exception of yaws.

Among the latest observers to report on the method are Hartman and Reyner,[4] who, following a critical investigation covering almost 7,000 tests, speak of the method as "a specific test for syphilis."

Under these circumstances, the interest and importance attaching to weakly positive reactions with this method become intensified, and the question arises as to the influence of natural hemolysins on the results obtained with this method, particularly as the serum dose, when calculated in terms of the complement dose employed, corresponds to 0.3 or 0.4 c.c. in terms of the original Wassermann technic, and thus carries a relatively larger amount of natural antisheep hemolysins when these are present, with a possible effect, therefore, on the quantitative relations of the antisheep hemolytic system employed in the method.

Kolmer, in his original communication, states that in his new method the influence of the natural hemolysins is rendered "negligible" and absorption of serums prior to the test unnecessary.

Workers with the method have become familiar with the occasional anomalous reactions in the first tube of the series in which the degree of fixation with 0.1 c.c. of serum may be less than that obtained with 0.05 c.c. of serum, giving, for example, such a reaction as 24400. My own experience encompasses occasional instances of such a reaction as 04400.

The natural explanation of such reactions is to ascribe them to the natural hemolysin present in such amounts as to produce partial or even complete hemolysis in the first tube (0.1 c.c.), while without such effect when decreased in amount by the dilution of the serum in the subsequent tubes of the series.

Kolmer, however, notes the occurrence of such reactions with an antihuman hemolytic system and with serums shown not to contain natural antisheep hemolysin, and the latter observation is corroborated in my own experience reported elsewhere.[5]

In view, however, of the theoretical possibility of natural antisheep hemolysin being present in a serum in such quantity as to permit in 0.0025 c.c. of serum a residuum of hemolysin sufficient to hemolyze completely the test dose of sheep cells (0.5 c.c. of 2 per cent. suspension) and so produce a false negative reaction throughout the entire

4. Hartman, F. W., and Reyner, C. E.: The Kolmer Complement-Fixation as a Specific Test for Syphilis, J. A. M. A. **98**:196 (Jan. 19) 1924.

5. Kilduffe, R. A.: The Influence of the Natural Antisheep Hemolysins in Human Sera on the Production of Anomalous Reactions in the First Tube of Kolmer's Quantitative Complement-Fixation Test for Syphilis, to be published.

series of tubes, and in view of the increasing significance to be attached to even weakly positive reactions by this method, it was thought of interest to study the question, and the results of the investigation are herewith reported.

The plan adopted was, first, to select from the serums subjected to routine examination by Kolmer's quantitative method all those containing in 0.1 c.c. sufficient amounts of antisheep hemolysin to hemolyze completely the test dose of cells after one hour's incubation in the water bath at 38 C.; to select from such serums those giving negative reactions with Kolmer's quantitative method; to absorb the natural hemolysin; to test for complete absorption; and, finally, to repeat the complement-fixation test by the quantitative method.

All the serums were fresh, as a rule not more than twenty-four hours old, and inactivated for fifteen minutes at 56 C. both prior to and subsequent to absorption. As by this method preserved complement was utilized, and as the antigen and amboceptor used throughout the series were the same, the tests are comparable.

The complement-fixation tests were made exactly as described by Kolmer, using the antigen also described by him, with the exception that his shorter (four hour) period of incubation was used. This was necessitated in the original test by exigencies outside the investigation, and the repetition of the test after absorption was also with the four hour period in order that the results might be comparable in this respect.

After absorption, the serums were again inactivated—having been kept in the icebox over night—for fifteen minutes at 56 C. and tested for the complete removal of the natural hemolysins by adding to 0.1 c.c. of serum 1 c.c. of 1:30 complement carrying "two full" units of complement as determined by Kolmer's method of complement titration and 0.5 c.c. of 2 per cent. suspension of sheep cells and incubating in a water bath for one hour at 38 C.

It is apparent that if removal of antisheep hemolysin is to be a routine procedure in the examination of a large number of serums, the method adopted must be relatively rapid and simple as well as efficacious.

A fact not noted by all, but commented on by some observers, is that not a few of the methods proposed for the absorption of natural antisheep hemolysin result in the development in the absorbed serums of thermostabile anticomplementary properties, and in the early part of this investigation such an occurrence was not infrequent, and a source of some annoyance. Finally, however, the method proposed by Kahn [6] was adopted with complete satisfaction, absorption of hemolysin

6. Kahn, R. L.: A Simple Method for the Removal of Natural Hemolysins from Human Sera, J. Lab. & Clin. Med. **6**:4 (Jan.) 1921.

being complete in every instance without the development of anticomplementary properties, and all the serums reported in this investigation were absorbed by this method.

In all, a total of 300 serums were subjected to examination.

Each serum, prior to absorption, contained in 0.1 c.c. sufficient hemolysin to hemolyze completely the test dose of cells, and was completely negative to the quantitative complement-fixation test.

To approximately 1 c.c. of serum, approximately 0.1 c.c. of washed and packed sheep cells were added and the mixture allowed to stand for ten minutes at room temperature. The serum was then removed by centrifugation, stored in the ice chest over night, reinactivated for fifteen minutes at 56 C. and retested by the quantitative method. Each serum, prior to repeating the complement-fixation test, was tested for the complete removal of the natural amboceptor as indicated above, which was in all instances shown to be complete.

In the 300 serums negative before absorption, there were thirty-three which after absorption gave positive results of varying degree, an incidence of approximately 10 per cent.

The strength of the positive reactions are shown in the tables below.

TABLE 1.—*Serums Showing Weakly Positive Reactions After Absorption*

40000	20000	40000
20000	40000	40000
10000	10000	20000

Table 1 shows nine serums giving reactions in the first tube varying from plus 4 to plus 1, which, evidently, had been masked by the presence of natural hemolysin before absorption.

Table 2 shows twelve serums giving moderately positive reactions after absorption and the strength of the reaction in the reacting tubes.

TABLE 2.—*Serums Showing Moderately Positive Reactions After Absorption*

44000	44000	11000	42000
44000	11000	41000	44000
42000	44000	22000	42000

In Table 3 are shown the results obtained with twelve serums which gave a strongly positive reaction after absorption.

TABLE 3.—*Serums Showing Strongly Positive Results After Absorption*

44100	44400	44400	44400
44400	44400	44400	44400
41100	44400	44400	44400

There were no serums in the series in which the effect of the presence of natural antisheep hemolysin was evident below the third tube containing 0.025 c.c. of serum.

COMMENT

The results of the investigation are of decided interest from several angles.

The results are entirely comparable to those of Kolmer and Rule in that it is shown that even large amounts of natural amboceptor are insufficient to make entirely a positive result with a serum containing very large amounts of syphilitic reagin as evidenced by fixation in the fourth and fifth tubes of the quantitative set-up. They also demonstrate, however, that a serum may contain a relatively large amount of reagin in amounts sufficient to give fixation of complement when the serum dose is only 0.025 c.c. and that this reaction, because of the fact that the hemolysin content is sufficently high to exert an influence in the same quantity of serum, may be entirely lost.

It was, in fact, rather surprising to find that of the thirty-three serums giving positive reactions after absorption, only nine were of weakly positive type and reacting only in the first tube. It is conceivable that such a reaction might be masked by a large amount of hemolysin coincidently present, but it was not expected that the effect of the natural amboceptor would be shown in as small an amount of serum as 0.025 c.c.; this, nevertheless, was shown to be the case.

It is also interesting to note the relatively enormous content of natural hemolysin which may be present, as evidenced by the reactions shown in Table 3.

It was, of course, recognized that a slight destruction of thermolabile reacting bodies occurs during inactivation, and it was also recognized as a theoretical possibility that the repeated heating during the second inactivation might result in the loss of only a minute amount of reagin present. The total period of exposure to 56 C., however (thirty minutes), is not longer than that formerly made use of, and reagin present in so small an amount as to be totally destroyed by this degree and period of heating would, in all likelihood, not be detected by any technic and, if detected, in the light of our present knowledge, would give a reaction so slight as to be of dubious significance in the last analysis.

It is not thought, therefore, that the 267 serums which were again negative after absorption represented other than true negative reactions due to the absence of reagin.

While, of course, a larger series might to some extent appreciably alter the percentage of positive reactions obtained after absorption, the results of the series examined suffice to show that approximately 10

per cent. of weakly positive, moderately positive and even strongly positive serums (as read by Kolmer's scale) may be completely missed by reason of the coincident presence of extremely large amounts of natural antisheep hemolysins, and that the delicacy of the reaction by this method is affected to that degree.

The question now arises whether or not, in the interests of improving the delicacy of the method, the natural hemolysins must be taken into consideration and accounted for, whether or not serums for examination must be absorbed.

The matter admits of some discussion. On the one hand, in spite of this demonstrable effect of natural hemolysins, the method advocated by Kolmer and adopted by all who have tried it fairly and without prejudice, has been shown in an extensive series of comparative investigations to be more delicate than the majority of methods in common use so that, if delicacy alone were at stake, it would still be to a greater or less extent a matter of choice whether or not to use only absorbed serums with this technic. Without absorption, the method would still be superior to most in delicacy; with absorption, this superiority would be markedly enhanced.

On the other hand, the fact cannot be overlooked that a perceptible number of clinicians in general are habitually apt to place an entirely unwarranted interpretation on the significance of a single negative serologic examination, and so a definite number of syphilitic patients are going to be dismissed prematurely from treatment or observation and a similar number whose disease may not be particularly symptomatically active will be overlooked and not subjected to treatment without needless delay.

The only remedy for this lies in persistent and consistent attempts at education. While the serologist must do all in his power to render his technic as delicate and reliable as may be possible, it is equally his duty to emphatically and persistently reiterate the fact that the complement-fixation test constitutes only a *single phase* of the clinical, laboratory, and therapeutic study of syphilis.

If this were generally known and appreciated by clinicians at large and single serologic negative reactions always conservatively interpreted, especially in the presence of suggestive or suspicious historical or clinical coincident data, in the interests of lessening the time and labor involved, the Kolmer method might be looked on as satisfactorily delicate without prior absorption of the serum to be tested, and this step not deemed an essential prerequisite.

Rightly or wrongly, the matter of time and labor involved will have a definite influence on the adoption or rejection of a proposed technic which is otherwise acceptable, especially when large numbers of serums are examined in a routine manner.

Markedly influencing the desirability and necessity of absorption of natural hemolysin from serums prior to testing with Kolmer's method, is the fact that this method has been shown to possess a remarkable degree of specificity.

In view of this fact, and in view of the further fact that, by reason of the extraordinary specificity of the method, great reliance and significance may be attached to the weakly positive reactions obtained with it, the still further fact that absorption of natural amboceptor will result in the detection of a perceptible number of positive reactions otherwise missed assumes a decided significance.

As long as far-reaching conclusions are to be drawn from the results of isolated serologic examinations; as long as much of the efficiency of the treatment of syphilis is directly dependent on its early initiation and prolonged persistence; as long as positive reactions by Kolmer's method have been shown to possess a high degree of specificity; as long as absorption of hemolysins prior to the test definitely increases the number of positive reactions obtained with this method; and as long as without absorption some of these positive reactions will be entirely missed and syphilis so temporarily or even permanently diagnostically overlooked—as long as these premises hold good, it is impossible to avoid the conclusion that the absorption of natural hemolysins prior to the test undoubtedly increases the delicacy of Kolmer's quantitative method and adds to its general efficiency and should become a part of the technic.

This, without question, adds somewhat to the time and labor involved. With the use of Kahn's method for the absorption of hemolysins the increase in either time or labor is not marked and cannot be put forward as a valid objection to the procedure. The clinician cannot object to a thorough physical examination just because it takes time, nor the surgeon refuse to adopt an efficient surgical technic simply because it is laborious. The serologist, on whom is too often thrown the main responsibility for the diagnosis of syphilis, is confronted with a similar situation and must take a similar stand.

CONCLUSIONS

1. Human serum may contain natural antisheep hemolysin in amounts sufficient to exhibit a specific effect in high dilutions.

2. Human serum may contain antisheep hemolysin in sufficient amounts to cause a false negative reaction in complement-fixation tests for syphilis when the serum is used in a dose of 0.025 c.c.

3. The presence of large amounts of natural antisheep hemolysin is not without effect on the reaction in Kolmer's quantitative complement-

fixation test for syphilis, even when the serum contains relatively large amounts of syphilitic reagin, and may give rise to false negative results in approximately 10 per cent. of hemolysin-containing serums.

4. The absorption of natural antisheep hemolysin from the serum prior to the performance of Kolmer's quantitative complement-fixation test increases the delicacy of the reaction and may be incorporated as a part of the technic, with definite advantages.

5. The method of Kahn for the absorption of antisheep hemolysin from human serums is rapid, simple and efficacious, and does not appreciably add to the time necessary for performing the test even when large numbers of serums are examined.

6. While Kolmer's method of complement-fixation as originally described has been shown to be superior to the majority of methods in common use, the use of hemolysin-free serums with this technic definitely improves its delicacy.

Obituary

RANDOLPH BRYAN CARMICHAEL

The recent and unexpected death of Dr. Carmichael will be deeply felt and regretted by his numerous friends and dermatologic associates. His modest and agreeable manner and lovable dispostion were apparent to all who came to know him, and those who knew him well found their friendship gradually ripening into a sincere affection.

Dr. Carmichael was born on June 20, 1869, at Fredericksburg, Va., where he died on Sept. 3, 1924. He was a son of Dr. Spottswood Wellford Carmichael, a surgeon in the Confederate army, and Fanny Tucker Bryan, and he was the fifth physician in a line of descendants in Scotland and Virginia. He received his early education at the old Pantop School near Charlottesville, Va., and later attended the University of Virginia, where he began his medical study in 1887. He received his degree of M.D. from the Jefferson Medical College at Philadelphia in 1889. After serving as house surgeon in the New York Post-Graduate Hospital from January, 1890, to June, 1891, he began his dermatologic practice in the office of Dr. G. H. Fox in New York City, and from 1891 to 1896 was an assistant in the Vanderbilt Clinic.

In 1896, he settled in Washington, D. C., where he soon became professor of dermatology in the George Washington University. This position he has held since that time and has also served as dermatologist to the Garfield Memorial Hospital, Providence, Emergency Hospital, St. Elizabeth Hospital and other hospitals. He was a member of the Metropolitan Club in Washington. He was fond of hunting, fishing, horseback riding and other outdoor sports. He was a member of local medical societies in New York and Washington and a Fellow of the American Medical Association. He became a member of the American Dermatological Association in 1899, and his hospitable entertainments whenever the Association met in Washington will long be remembered with pleasure by those who were his guests on these occasions.

G. H. F.

RANDOLPH BRYAN CARMICHAEL, M.D.

1869-1924

UNIV. OF MICH.

Correspondence

FINDING THE ACARUS

To the Editor.—As a constant reader of your valuable journal, may I make a comment on the statement contained in Dr. Douglass W. Montgomery's article on the "Itch Mite and Its Burrow" in the October issue? Dr. Montgomery holds that "fishing" for the acarus with a needle is uncertain and unnecessary and that a better way is to pinch up a fold of the skin and shave off a slice of the epidermis.

The reason for this letter is that I hold that with due dexterity the extraction of the acarus is practically a certainty, that it is not a prolonged operation, that it does less damage to the skin, and in some cases may be the only method of demonstrating the cause of the disease without severe injury.

As regards the time taken in extraction, one of my students timed me during two extractions at the hospital, and the first time I was four seconds and the second five and a half seconds from starting the operation to the placing of the acarus on the slide.

The real importance, however, is not in time, which with either method is negligible, but in the fact that in a difficult case the added accuracy of observation entailed in being able to recognize the acarus in the epidermis may secure the diagnosis.

A patient was once sent to me who had a single edematous papule on the glans penis; there was no other eruption and no itching. The question was as to whether the lesion was an early primary sclerosis or not, and the habits of the patient were so promiscuous that no information could be obtained from the history. There was a slight fluffing up of the horny layer in the center less than a millimeter in length; there was no vesicle. With the watchmaker's lens, I was fortunate enough to recognize the acarus lying in the very thin horny layer. I was able to extract it and thus to establish the diagnosis. This is undoubtedly the earliest case of scabies that I have ever seen, but my late friend and teacher, Dr. Colcott Fox, told me that he had had similar experience.

The attempt to cut out a run from a very thin epidermis of the glans penis would, I think, even with the greatest skill have entailed a nasty sore place.

ARTHUR WHITFIELD, M.D., London.

Abstracts from Current Literature

THE USE OF TRYPARSAMIDE IN NEUROSYPHILIS. W. F. LORENZ, A. S. LOEVENHART, T. F. REITZ and C. P. ECK, Am. J. M. Sc. **168**:157 (Aug.) 1924.

One hundred and eighty-five patients with neurosyphilis were treated over a two year period: ninety cases of general paralysis, twenty-three cases of asymptomatic paralysis, twenty-nine cases of meningovascular syphilis, fourteen cases of taboparalysis, and twenty-nine cases of tabes. Over 80 per cent. of the early paralytic and meningovascular patients were either restored to health or greatly improved. Some were unimproved, and the condition of a few was aggravated. The blood Wassermann test showed corresponding improvement, but the spinal fluid serology, while showing great improvement, did not reach normal as frequently as the blood. The results of treatment in tabes and taboparalysis were not so pronounced.

It was found that clinical improvement preceded the serologic, and definite paralytic psychoses disappeared as the result of treatment, the mental restoration having persisted for more than two years.

Thirteen patients showed visual disturbances during the course of treatment, the condition of only one of these not clearing up after the drug was discontinued. The other twelve were later treated with tryparsamide without untoward effects.

JAMIESON, Detroit.

OCULOMOTOR PALSY WITH PARENCHYMATOUS KERATITIS IN CONGENITAL SYPHILIS. A. F. LUHR, Am. J. Ophth. **7**:293 (April) 1924.

A case of this uncommon condition is reported, including a summary of four similar cases previously recorded elsewhere.

OPHTHALMOPLEGIA IN LUETIC BASILAR MENINGITIS. A. H. PEMBER, Am. J. Ophth. **7**:294 (April) 1924.

A case is reported in which there was a syphilitic neuritis causing a homonymous hemianopsia and optic atrophy associated with a gummatous basilar meningitis, causing a bilateral ophthalmoplegia.

LICHEN PLANUS OF THE CONJUNCTIVA. A. F. LUHR, Am. J. Ophth. **7**:456 (June) 1924.

This condition was observed on the bulbar conjunctiva of a patient reported to have a generalized lichen planus of seven years' duration. The conjunctival lesions disappeared after two treatments of one-sixteenth skin units each of unfiltered roentgen rays.

H. R. FOERSTER, Milwaukee.

TRYPARSAMIDE IN THE TREATMENT OF SYPHILIS. J. E. MOORE, H. M. ROBINSON and A. KEIDEL, J. A. M. A. **82**:528 (Feb. 16) 1924.

Tryparsamide was found to be less efficacious than arsphenamin in the treatment of early and late cutaneous syphilis and in other forms of the disease, with the exception of neurosyphilis. In cardiovascular syphilis, however, it should be given further trial, as there was some evidence of a benificent effect. In early neurosyphilis, the drug is not advised, but in late neurosyphilis

it appears to be the most effective medicament now available. In the author's series, a number of patients had been treated for long periods with arsphenamin and mercury without clinical or serologic improvement. In a majority of these cases, tryparsamide caused a clinical arrest and negative or improved spinal fluid findings. This applied both to the parenchymatous and meningovascular forms of neurosyphilis.

The drug may cause amblyopia; for that reason, a warning is issued against its use in any case in which there is involvement of the optic tract. Close attention should also be given to the fundus of the eye and the sight during treatment with the drug.

THE SIGNIFICANCE OF STREPTOCOCCUS HEMOLYTICUS IN SCARLET FEVER. A. R. DOCHEZ and L. SHERMAN, J. A. M. A. **82**:542 (Feb. 16) 1924.

From previous studies, the authors are of the opinion that a streptococcus of a specific biologic type is the cause of scarlet fever. By inoculation of guinea-pigs with this organism, a disease resembling scarlet fever in its main features can be produced.

A horse was immunized to this streptococcus, and an antiserum obtained that was capable of blanching the rash and ameliorating the other symptoms of scarlet fever.

Dochez and Sherman conclude that the natural as well as experimental immunity developed by inoculation of animals with this streptococcus is antitoxic in nature.

SCARLET FEVER TOXIN IN PREVENTIVE IMMUNIZATION. G. F. DICK and G. H. DICK, J. A. M. A. **82**:544 (Feb. 16) 1924.

In these experiments, the authors used a toxic filtrate obtained from cultures of a hemolytic streptococcus which the authors previously concluded was the cause of scarlet fever.

Volunteers who had no history of scarlet fever and who gave positive skin reactions to the toxin, were injected with the filtrate. All developed mild constitutional symptoms and subsequently gave negative or faintly positive skin tests. Blood serum of one of the volunteers after injection of the filtrate neutralized a 1:500 dilution of the toxin. Another experiment was conducted to determine the effect of heat on the filtrate. The toxin was destroyed at temperatures above 80 C. for one hour, and was not affected by heating below that degree.

It is concluded that the toxic substance is a true toxin capable of forming an antitoxin.

A CASE OF CAROTINEMIA. F. W. NISHAUS, J. A. M. A. **82**:547 (Feb. 16) 1924.

The patient, a diabetic, who was eating a large amount of carrots, developed a yellowish discoloration of the skin, which diminished or increased as the diet contained smaller or larger amounts of carrot. The blood serum showed an increased pigment content, but tests for carotin were not performed.

THE INTRAPERITONEAL ADMINISTRATION OF NEO-ARSPHENAMIN: PRELIMINARY REPORT. W. ROSENBERG, J. A. M. A. **82**:682 (March 1) 1924.

On the assumption that the various routes advocated for the administration of the arsphenamin in congenital syphilis were unsatisfactory, the author investigated the intraperitoneal route. In thirty-five rabbits, no serious effect

was observed from the administration of the drug intraperitoneally. Concentrated solutions appeared to produce less discomfort than dilute solutions. One congenitally syphilitic child was treated with neo-arsphenamin introduced intraperitoneally, apparently with good results clinically, and without ill effects to the peritoneum.

THE COLLAR OF VENUS: MELANOLEUKODERMA COLLI OF SYPHILIS. HERMAN GOODMAN, J. A. M. A. **82**:701 (March 1) 1924.

The clinical symptoms and differential diagnosis of the condition are discussed.

TREATMENT OF SYPHILIS COEXISTENT WITH A CONDITION SIMULATING DIABETES. J. E. PAULIN and H. M. BOWCOCK, J. A. M. A. **82**:702 (March 1) 1924.

The author's patient had latent syphilis and glycosuria. She became permanently sugar free on a full diet after a course of antisyphilitic treatment. The literature on diabetes apparently due to syphilis is reviewed. The authors are of the opinion that the diabetic symptoms are due to a syphilitic pancreatitis, and the condition is not true diabetes mellitus.

TREATMENT OF SCARLET FEVER WITH SCARLATINAL ANTISTREPTOCOCCIC SERUM: PRELIMINARY REPORT. F. G. BLAKE, J. D. TRASK and J. F. LYNCH, J. A. M. A. **82**:712 (March 1) 1924.

The authors used Dochez's serum, produced by immunization of a horse with the specific type of *Streptococcus hemolyticus* that has been found in scarlet fever by a number of investigators.

They first investigated the capacity of the serum to blanch the reaction to intracutaneous tests of scarlatinal toxin, and found it capable of doing this uniformly. It was then used in twelve early cases of scarlet fever, five of them of severe nature. In all but the two most toxic cases, one injection of from 40 to 60 c.c. of serum led to rapid recovery in from twelve to thirty-six hours. In the two severely toxic cases, 200 c.c. of serum were required.

Thus, in early cases the serum gave uniformly successful results. In one late case, 40 c.c. were given, and the rash disappeared, but no effect on the complications was observed.

In addition to its probable diagnostic value, the serum appears to possess pronounced curative properties.

METASTATIC BASAL CELL CARCINOMA FROM THE SKIN: REPORT OF TWO CASES. C. W. FINNERUD, J. A. M. A. **82**:775 (March 8) 1924.

Only five similar cases have been reported in the literature, and only one of them has been definitely proved. Finnerud's first patient had metastasis of the submaxillary lymph glands from a primary lesion near the zygoma. The original lesion had recurred several times following excision but was finally healed by radiotherapy. Histologic examination of both primary and metastatic growth demonstrated basal cell carcinoma.

In the second case, the growth originated at the midline of the upper lip and gradually invaded the right cheek. A metastatic nodule developed in the right submaxillary region. Histologic examination of the original and secondary growth revealed basal cell lesions.

In each case, a number of years intervened between the onset of the primary tumor and the development of metastasis.

CONVALESCENT SERUM IN THE TREATMENT OF ERYSIPELAS. H. P. B. JORDAN and C. C. DUSTIN, J. A. M. A. **82**:784 (March 15) 1924.

The serum employed was obtained from patients convalescent from erysipelas. It can be placed in ampules and stored for months at icebox temperature.

Eighteen patients were treated; three died, but were moribund when seen, thirteen recovered promptly, and in two the result was indefinite. These cases were selected because of their severity. The authors consider the serum of decided value.

ACNE DUE TO MILK ALLERGY. A. H. HOGE, J. A. M. A. **82**:788 (March 8) 1924.

The patient had a severe nodular acne, which had been treated without success by a competent dermatologist. The reporter found a strong cutaneous reaction to milk, and on interdiction of this food, without other treatment, the disease disappeared. It recurred when milk was partaken of, and again disappeared when ingestion of milk was stopped.

SYPHILITIC BURSITIS. J. E. LANE, J. A. M. A. **82**:852 (March 15) 1924.

Lane describes two cases of this apparently rare condition, and reviews the literature, in which less than thirty cases have been recorded.

The author's first case was bilateral (prepatellar bursae) and required surgical intervention before cure was obtained; the second case was unilateral (olecranon bursa) and was cured with antisyphilitic therapy alone.

Stress is laid on the possibility of syphilis as an etiologic factor in bursitis In textbooks and current articles, this possibility is hardly mentioned.

THE USE OF ARSPHENAMIN AND ITS DERIVATIVES ADMINISTERED BY RECTUM. S. LITTMAN and J. G. HUTTON, J. A. M. A. **82**:868 (March 15) 1924.

From clinical studies on congenital syphilitic infants, as well as adults with active lesions, Littman and Hutton conclude that rectal administration of arsphenamin has no appreciable effect on the disease. Both solutions and suppositories containing the drug were employed.

DERMATOMYOSITIS. L. G. HEYN, J. A. M. A. **82**:1019 (March 29) 1924.

A case of this rare disease is reported. The patient, aged 35, after exposure, developed stiffness of the entire body, and discomfort on movement. An edema of unusual distribution was present. It was particularly noticeable on the arms, thighs, neck and upper part of the chest. A striking feature was the immobility of the patient. The affected parts were extremely painful on pressure. There were no apparent visceral changes, and laboratory examinations were negative, with the exception of a strongly positive reaction.

The disease did not respond to antisyphilitic therapy or to salicylates, but rapid improvement occurred after the administration of calcium chlorid.

INFECTIONS OF THE LIP. M. KAHN, J. A. M. A. **82**:1043 (March 29) 1924.

Three fatal cases of this nature were seen in one year by the author. Each began as an ordinary pimple, was squeezed or picked and resulted in septic thrombosis. If infections of the lip are left alone, they will practically always take care of themselves; if traumatized, thrombophlebitis of the tributary veins may occur, with general septicemia and death.

The abundant venous supply of the lip and the lack of connective and fatty tissue in which an infection may be trapped, explain the potential seriousness of ordinary lip infections.

MICHAEL, Houston, Texas.

KERATOMA PLANTARE SULCATUM. R. W. MENDELSON, J. Trop. Med. **22**:39 (Feb. 15) 1924.

The author describes cases of this condition occurring frequently among soldiers and policemen in Siam, due to the constant irritation from lack of shoes and also to body weight. The keratosis was complicated by deep fissures through the true skin, which later became infected and perhaps led to complete incapacitation. Punched out holes may result from detachment of keratotic areas. Absolute rest, keratolytic agents, such as salicylic acid and green soap, are all that are necessary for a cure.

AN UNUSUAL CASE OF VITILIGO IN A NATIVE OF THE SUDAN. R. G. ARCHIBALD, J. Trop. Med. **26**:361 (Dec. 15) 1923.

In this patient, extensive areas of complete depigmentation occurred during three years, together with similar changes in the scalp, pubic and axillary hair. Atrophic changes in the cells of the stratum granulosum and rete mucosum were noted, together with loss of pigment in pigment-bearing areas. There was low blood pressure (systolic 95, diastolic 100), and the author thinks that some endocrine disturbance of suprarenal origin may possibly be an etiologic factor. On exposure to sunlight, pigment began to return in the depigmented areas.

SOME EXPERIMENTS ON ERYSIPELAS. M. CRENDIROPOULO, J. Trop. Med. **27**:97 (March 1) 1924.

As the result of experiments on rabbits, guinea-pigs and white rats, the hypothesis is advanced that there is a filterable virus in erysipelas which gives it its particular stimulus, this virus usually being accompanied by the streptococcus and producing its manifestations by a close symbiosis.

JAMIESON, Detroit.

TWO CASES OF HYDROA AESTIVALE WITH NOTES OF THREE OTHER CASES. H. W. BARBER in conjunction with J. H. RYFFEL, W. PAYNE and F. D. HOWITT, Proc. Roy. Soc. Med. **17**:19 (Feb.) 1924.

GROUP I.—The juvenile type in which the eruption is more severe, as a rule, than in Group II, and in which hematoporphyrin may be formed in such quantity as to cause hematoporphyrinuria. In this type, the gastric hydrochloric acid is not diminished, and the hematoporphyrin is present in considerable quantity in the feces, both on a full diet and on a meat-free diet.

GROUP II.—The adult type (in one of their cases the eruption apparently appeared first in childhood but always disappeared entirely in winter), in which the eruption tends to be less severe than in Group I, and in which hematoporphyrin has not yet been detected in the urine. In this type, the gastric hydrochloric acid is either completely absent or extremely low (complete achlorhydria has been found in all our cases of this type), and the hematoporphyrin is present in marked quantity in the feces on a full diet, but completely absent on a meat-free diet.

It would therefore appear from the cases so far investigated that in the juvenile type there is probably an inborn error of metabolism whereby hematoporphyrin is formed in excess, independent of diet, although the sensitiveness to light may not appear until several years after birth. In a case published by Sir Archibald Garrod, the first urine passed by the child was "red," and at the age of 3 months, a bullous eruption appeared on the face and hands, which disappeared before the end of the first year and left no scars; the teeth were pink, and the urine contained hematoporphyrin. Later, the typical eruption of hydroa aestivale appeared, and left scars.

In the adult type, on the other hand, the hematoporphyrin is present only on a meat-containing diet, which would suggest that the hematoporphyrin is formed from the hemoglobin contained in meat. It is possible that the absence of hydrochloric acid from the gastric juice, which has been constant in the authors' cases of this type, is connected with this. Professor Gowland Hopkins is now investigating the possibility of hematoporphyrin being formed from hematin by the action of intestinal bacteria.

GUY, Pittsburgh.

PIGMENTARY ERUPTION FOLLOWING TREATMENT WITH ARSENIC AND BISMUTH. COURCOUX and BOUTELIER, Bull. Soc. franç. de dermat. et syph. **31**:59, 1924.

An intensely pruritic urticarial eruption followed injections of a bismuth preparation, and after it had persisted for two months, examination revealed the presence of erythematosquamous plaques, pigmented follicular papules and pigmented patches of various sizes, the flexures being especially affected, and the hands, legs, feet and face being exempt. The eruption was apparently due to the bismuth rather than to the arsenical preparation.

DERMATOFIBROMA OF THE ABDOMINAL WALL. J. DARIER and FERRAND, Bull. Soc. franç. de dermat. et syph. **31**:63, 1924.

Tumors in the subumbilical region of nine years' duration, in a man, aged 42, attained an area of 200 sq. cm. Recurrence followed the use of radiotherapy.

A CASE OF OSTEOCHONDROMA OF THE THUMB AND ITS METACARPAL BONE; A BEGINNING OSTEOCHONDROMA OF THE FOREFINGER. LOUSTE and VALIÈRE VIALEIX, Bull. Soc. franç. de dermat. et syph. **31**:64, 1924.

In a farmer, aged 18, these tumors, of two years' duration, were found to be a combination of osteochondroma, enchondroma and perichondroma. They were considered potentially premalignant.

A CASE OF MULTIPLE TUBERCULOUS ULCERATIONS: A LARGE THORACIC ULCERATION; SEVERE OSTEO-ARTICULAR LESIONS TOGETHER WITH PULMONARY INVOLVEMENT. LOUSTE and VALIÈRE VIALEIX, Bull. Soc. franç. de dermat. et syph. **31**:66, 1924.

A man, aged 27, with tuberculous ancestry, had had the cutaneous lesions for a year. Roentgenographic studies are reported.

A CASE OF "PIGEONNEAU." ANDRE LÉRI and R. BARTHÉLEMY, Bull. Soc. franç. de dermat. et syph. **31**:71, 1924.

This condition, consisting of ulcerations resembling the eye of a pigeon, appears in tanners as a trade lesion, and has been described by Prosser White under the designation of "chrome holes." The causative agent is apparently

chromic acid derived from the bichromates used in the industries. In this case, the hands and arms of a tanner, aged 43, were affected, and two photographs show the lesions.

A Case of Subacute Lupus Erythematosus of Exanthematic Type. Jeanselme and Burnier, Bull. Soc. franç. de dermat. et syph. **31**:74, 1924.

An edematous eruption of sudden onset occurring in a man, aged 33, presented features resembling those of facial erysipelas, acute scleroderma and dermatomyositis, but the histologic findings and the late appearance of atrophy served to establish a diagnosis of lupus erythematosus.

A Case of Congenital and Familial Alopecia. Jeanselme and Rimé, Bull. Soc. franç. de dermat. et syph. **31**:79, 1924.

In a girl, aged 17, and in her mother and twelve other ancestors of both sexes, there was a partial aplasia of all the hairs of the body, and an increased fragility of the nails. The children were born with apparently normal hair, but after a few weeks had elapsed, the abnormality appeared and persisted throughout life. Some members of the family were immune. There was a suggestion of the keratosis pilaris of the scalp, as seen in monilethrix, but the hairs were not beaded.

Two Cases of Symmetrical Familial Palmar and Plantar Keratoderma in Brother and Sister, with Coexisting Severe Dental Alterations in Both. Papillon and P. Lefèvre, Bull. Soc. franç. de dermat. et syph. **31**:82, 1924.

The son, aged 6, and the daughter aged 4½, of consanguineous parents presented the characteristic picture of mal de meleda, and in each case there were psoriasiform patches on the knees.

A Case of Alopecia Areata in Man and Wife. Sabouraud, Bull. Soc. franç. de dermat. et syph. **31**:87, 1924.

The man had had the condition for two and a half years, the woman for six weeks. This is the seventh instance of this kind which Sabouraud has encountered.

Paget's Disease of the Bone in Two Brothers. W. Dubreuilh and Laubie, Bull. Soc. franç. de dermat. et syph. **31**:87, 1924.

In two brothers, aged 77 and 72, otherwise healthy and apparently not syphilitic, the long bones especially were deformed.

A Comparison of the Reactions of Bordet-Wassermann and Syphilimetry, and Their Diagnostic Value. Gastou and Bèthoux, Bull. Soc. franç. de dermat. et syph. **31**:90, 1924.

Having made parallel tests in 919 cases, the authors conclude that the Hecht modification is more sensitive and therefore more valuable than the Vernes reaction.

The Importance of Alterations in the Vasomotor Reflexes of the Skin in the Treatment of Skin Diseases. Pierre Nicolski, Bull. Soc. franç. de dermat. et syph. **31**:94, 1924.

Vasomotor disturbances accompany various dermatoses, and according to the author they may easily be investigated by gently drawing the finger-nail

over the skin and noting whether a pale or an erythematous line appears and persists for several minutes. This phenomenon depends on the condition of the vasodilator and vasoconstrictor nerves, respectively: whether hyperactive, hypo-active or paralyzed. The reaction on affected parts may be different from that on the surrounding apparently normal skin. The value of therapy seems to hinge on this condition, and with white dermographism warm applications are usually indicated, whereas cold applications are helpful in cases showing red dermographism. Frequently, vasomotor conditions change during the course of treatment, calling for a change in the applications.

A Case of Sarcoma of Kaposi Occurring in Algiers. J. Montpellier and A. Lacroix, Bull. Soc. franç. de dermat. et syph. **31**:100, 1924.

A typical case of eight months' duration is reported as occurring in an Italian, aged 80, who had lived in Algiers for forty years.

Cervical Zoster of the Subhyoid Region; Absence of Pain During the Eruption; Late Neuralgia. Henri Pelon, Bull. Soc. franç. de dermat. et syph. **31**:102, 1924.

The patient was a woman, aged 30, who had not been exposed to varicella.

Parkhurst, Toledo, Ohio.

Does Bismuth Injected Into the Muscles and Veins Pass Into the Cerebrospinal Fluid? E. Jeanselme, M. Delalande and Terris, Presse méd. **36**:245 (March) 1924.

The authors were unable to find bismuth with the most sensitive chemical tests in a series of patients with cerebrospinal syphilis, who had received bismuth in various preparations intramuscularly, in large quantities. These findings are contrary to those of Fournier, Guenot and others. The authors also state that they could not find even the slightest trace of arsenic in the cerebrospinal fluid in syphilitic persons treated by arsphenamin. The authors believe that the apparent finding of bismuth in the fluid formerly was due to a reaction caused by other agents and not by bismuth. They, however, state that the salts of bismuth and the arsenical preparations impregnate the central nervous system by acting directly on the cerebrospinal and meningeal lesions without passing into the cerebrospinal fluid, and that they in this way are beneficial. Clinical observation has shown, however, that bismuth has a good effect in certain forms of nervous system syphilis.

Failure of Sulpho-Ichthyolate Preparation. L. Cheinesse, Presse méd. **36**:259 (March) 1924.

The author was interested in the findings of the Council of Drugs and Chemicals of the American Medical Association. For this reason, he had occasion to look up many of the articles written in the journal mentioned above during the past twenty years. He states that P. Unna was the first to recommend it to dermatologists; then came the gynecologist, urologist and laryngologist—all report favorable results. After perusing the literature in France, he came to the conclusion that the sulpho-ichthyolate preparation is nothing but a mild antiseptic. He believes that many of the miraculous results were due to some other ingredient in the prescription.

THE DYEING OF HAIR. R. SABOURAUD, Presse méd. **36**:899-905 (May) 1924.

Sabouraud discusses in detail the agents used in the dyeing of hair, of which there are five types. The first are reagents which are decolorizers, changing the hair from light to dark; the second are pure vegetable dyes, such as henna and indigo; the third are the metallic bases, which include lead, copper, cadmium and silver; the fourth are Rastiks, which is the name used for a combination of two chemicals which react and make pyrogallic acid, which is used in changing hair to a dark brown color; the fifth is the anilin dye, which is chloral hydrate and paraphenylendiamin, called by some hair dressers merely "Para." This dye may cause a dermatitis.

Of all the dyes which are used, henna is perhaps the least harmful. Some of the metallic dyes are slightly poisonous, and other dyes cause the hair to become brittle and break readily. He advises against dyeing the hair unless it is absolutely necessary, as there is no dye that is harmless. If necessary, one should pick out the dye best suited for his complexion and have an expert apply it.

McCAFFERTY, New York.

LICHEN PILARIS SEU SPINULOSUS CROCKER. E. FREUND, Gior. ital. d. mal. ven. **44**:1195 (Dec.) 1923.

A report and pathologic study are given of a case of this disease in a patient 23 years old. Two other members of the family were similarly affected. Histologically, the author found hyperkeratosis and parakeratosis of the hair follicle, atrophy of the hair, keratinization of the prickle cells of the follicle and perifollicular infiltration of round cells. In the corium, there was atrophy of the sebaceous glands and slight perivascular infiltration. He also found that the hyperkeratosis extended beyond the hair follicle, forming a bridge of scales between the glandular outlets.

THE CHOLESTERIN CONTENT OF THE BLOOD IN SYPHILITIC PATIENTS. G. BRESCIANI, Gior. ital. d. mal. ven. **44**:1233 (Dec.) 1923.

In 99.16 per cent. of the cases of untreated secondary syphilis there is a marked diminution of the cholesterin content of the blood. In primary cases, only 25 per cent. show hypocholesterinemia. In tertiary and congenital cases, 66 per cent. show a diminution of the blood cholesterin. Specific treatment increases the amount of cholesterin in the blood reaching the normal in a short time.

GRANULOSIS RUBRA NASI. M. ARTOM, Gior. ital. d. mal. ven. **44**:1281 (Dec.) 1923.

This is a report of a case in a child 27 months old. The patient also had enlarged mediastinal glands and a cutaneous tuberculous gumma. The Pirquet tuberculin test was positive. The author concludes that this condition should be classified among the tuberculids.

STUDIES ON THE VIRUS OF HERPES. G. MARIANI, Gior. ital. d. mal. ven. **65**:126 (April) 1924.

This is a report on a series of biologic studies on the filtrable virus of herpes. The author studied the experimental production of keratitis, conjuunctivitis, rhinitis, herpes of the skin, herpes genitalis, meningo-encephalitis,

etc., and discussed the apparent clinical analogy between epidemic encephalitis and the experimental encephalitis produced in the rabbit by the virus of herpes. There seems to be no relationship between the two germs.

ADENOFIBROMA OF THE SWEAT GLANDS. T. SCOMAZZONI, Gior. ital. d. mal. ven. **65**:228 (April) 1924.

The patient, a youth, aged 17, presented numerous small tumors the size of a half pea on both hands and on the forehead. The color was that of the normal skin, and there were no subjective symptoms. On section, the tumors proved to be developed at the expense of the sweat glands, which were greatly enlarged and surrounded by a thick fibrous capsule. The epidermis over the tumor showed slight hyperkeratosis and acanthosis. The dermis showed marked diminution of the elastic tissue, increase of the collagen, dilatation of the vessels and slight perivascular infiltration.

INTRADERMIC VACCINE THERAPY AND PROTEIN THERAPY. G. A. AMBROSSOLI, Gior. ital. d. mal. ven. **65**:240 (April) 1924.

The intradermic injection of staphylostreptococcic vaccine in the treatment of pyoderma and certain forms of eczema is, according to the author, much more efficacious than the use of the same vaccine hypodermically. The intradermic injections of milk are not so good. The general reactional symptoms produced by vaccine therapy are avoided with this method. The local reaction at the site of the injection is rather violent.

LATE TOXIC PHENOMENA DUE TO INJECTIONS OF AMINO-ARSENO-PHENOL. L. CATTANEO, Gior. ital. d. mal. ven. **65**:255 (April) 1924.

The author reports a case of exfoliative erythroderma after fifteen injections of a French preparation of arsphenamin. He attributes the skin phenomena to the toxic action of the drug and to hepatic insufficiency of syphilitic origin.

ROENTGENOTHERAPY OF PSORIASIS BY BROCK'S METHOD. R. RUMMO, Gior. ital. d. mal. ven. **65**:578 (April) 1924.

Walter Brock of Kiel has obtained remarkable results in the treatment of psoriasis by irradiation of the thymus gland. The author of this article has confirmed Brock's results. Of twelve patients treated by him, five were completely cured, three were cured except for small lesions on the elbows and knees, two were improved and two were not influenced by the treatment. In no case was local treatment applied. The amount of irradiation applied was 1 Holzknecht unit, skin distance, with a filter of 4 mm. of aluminum, repeated every four weeks. Each patient received two treatments.

A SIMPLE METHOD TO AVOID NITRITOID REACTIONS. B. LIBONATI, Gior. ital. d. mal. ven. **65**:585 (April) 1924.

The author bleeds the patient before the injection of arsphenamin, removing through the injecting needle about the same amount of blood as liquid to be injected, usually about 3 c.c. He says that nitritoid reactions are unknown to him.

CONTRIBUTION TO THE STUDY OF HERPES GESTATIONIS. L. TOMMASI, Gior. ital. d. mal. ven. **65**:840 (June) 1924.

This is a report of a typical case of herpes gestationis followed by herpes menstrualis recidivans during eighteen months after the delivery. A similar

eruption of short duration was observed in the child. The patient recovered under treatment with ovarian extract. The author prefers the name of dermatitis Duhring gravidica, as expressing more accurately the true nature of the disease. Etiologically, the author expresses the opinion that these cases are the result of anaphylaxis.

RADIUM THERAPY OF ANGIOMA. L. MAZZONI, Gior. ital. d. mal. ven. **65**:920 (June) 1924.

Some cases of telangiectasis may be cured by electrolysis; some small angiomas may be excised; but the treatment of choice in the majority of the cases is by radium. The author has had wide experience in this form of therapy and presents a large statistical report and details of technic.

ACUTE LICHEN PLANUS. C. RAMORINO, Gior. ital. d. mal. ven. **65**:965 (June) 1924.

This is a report of a case of generalized lichen planus of acute onset. The author concludes from the study of this case that lichen planus may be so rapid and extensive in its development that it may, as in his case, assume an erythrodermic form; that in this, as in the majority of the patients of lichen planus, there is a nervous shock as the direct cause of the disease, and that these cases respond well to arsenic internally and especially to arsphenamin intravenously.

CONVULSIONS IN CONGENITAL SYPHILIS. J. C. VIVALDO, Prensa méd. argentina **10**:532 (Dec. 30) 1923.

This is a report concerning a case of epileptic convulsions in a child 11 months old. The patient recovered under injections of mercury and sulpharsphenamin. The author notes the frequency of convulsions in early childhood and their possible relation in many cases to congenital syphilis.

SYRINGOCYSTADENOMA. J. CERVERA, Prensa méd. argentina **10**:761 (March 30) 1924.

This is a report of an extensive case of this disease in an Italian woman, 28 years old. The interesting feature in this case was the diminished sweat secretion. The injections of one fourth grain (0.01 gm.) of pilocarpin had no effect on the function of the sweat glands of the patient.

ERYTHRODERMA DESQUAMATIVA AND KERATOMALACIA. G. SALVIOLI, Sperimentale **78**:5, 1924.

The author reports two cases of generalized dermatitis exfoliativa accompanied by ocular symptoms of keratomalacia in the new-born. The condition seems to be different from Ritter's disease and is probably due to lack of vitamins in the food.

PARDO-CASTELLO, Havana.

TREATMENT OF SYPHILIS USING ARSPHENAMIN EXCLUSIVELY (TEN YEARS' EXPERIENCE). RUDOLF KREFTING, Dermat. Ztschr. **36**:28, 1922.

From 1911 to 1920, the author treated, 1,749 persons who had syphilis, using arsphenamin exclusively. The primary cases were of the greatest interest, divided as they were into Wassermann-negative and Wassermann-positive groups. All of the Wassermann-negative primary syphilitics that remained

under observation were free from recurrences. Of 221 persons with seropositive primary syphilis, nineteen had recurrences. In the seronegative group, from three to five injections of from 0.3 to 0.6 gm. of old arsphenamin was sufficient; the seropositive group required more extended treatment. Persons in the secondary stage of syphilis were successfully treated with arsphenamin alone; of 668 persons so treated, only twenty-two showed recurrence, of whom three received mercury and other arsphenamin preparations without any favorable influence on the Wassermann reaction. All possible forms of tertiary syphilis, such as glossitis, orchitis, periostitis, nerve and brain syphilis, etc., responded. Persons with a positive Wassermann test were rarely not influenced. Although favorable results were obtained in tabes, and pain disappeared, the author did not give his results in paralysis. The Wassermann test was rendered negative in 262 patients with latent syphilis, among whom were ten women who had had abortions.

Case of Erythema Microgyratum Persistans. Rudolf Strempel, Dermat. Ztschr. **36**:63, 1922.

A series of cases is described under this title. The group is allied to chronic erythema, differing little except in chronicity from Jadassohn's erythema simplex gyratum. The etiology is considered to be the entrance into the blood vessels of toxic substances from caterial products owing to infection of the tonsils or mouth.

Dermatoscopic Investigations of Skin Diseases. Paul Hess, Dermat. Ztschr. **36**:71, 1922.

The Müller microscope was used, and the results were like those described by Saphier.

A Case of Recurring Erythema Multiforme with Lesions Predominating on the Mucous Membranes. Leo Wertheim, Dermat. Ztschr. **36**:125, 1922.

The patient had a pustular tooth fistula and a hereditary disposition to rheumatism. Recurring attacks of erythema multiforme on the mucous surfaces of the mouth and conjunctiva with later involvement of the skin, are reported.

Peripheral Facial Paralysis in Early Secondary Syphilis. E. Lehner and E. Vajda, Dermat. Ztschr. **36**:130, 1922.

In two cases of previously untreated syphilis, an attack of peripheral facial paralysis occurred one or two days after the appearance of lesions of the secondary stage of the disease. Treatment with mercury and arsphenamin caused a disappearance of the lesions.

Arsphenamin Urticaria and Angioneurotic Syndrome. R. Polland, Dermat. Ztschr. **36**:249, 1922.

A patient who had formerly tolerated injections of arsphenamin evidenced urticaria on injection of the third dose. Repetition of this dose recalled the symptoms. Injection of the first dose was well tolerated. The author considered that the larger dose was the limit of tolerance. The mucosa of the

upper air channels took part in this vasomotor disturbance evidenced on the skin by the formation of wheals. The use of sodium arsphenamin was not attended by any ill effects. A case is also reported in which injection of the seventh dose caused a scarlet fever-like eruption.

CONTRIBUTION TO CLINICAL AND BACTERIAL STUDY OF ULCUS PHAGEDENICUM. F. FISCHL and L. KIRSCHNER, Dermat. Ztschr. **36**:271, 1922.

A bacillus similar to the tetanus bacillus with similar spore formation was isolated in two cases of phagedenic ulcer of the lower extremity. The organisms grew in anaerobic mediums, but further differentiation was not possible. In four other cases, a spirillum and fusiform bacillus were found in symbiosis.

GOODMAN, New York.

EMPLOYMENT OF RADIO-ACTIVE MATTER IN SOLUTION. S. LOMHOLT, Acta Radiol. **2**:437 (Dec.) 1923.

This article records an interesting study carried out at the Finsen Light Institute, concerned with the cutaneous action of solutions of thorium emanation. The investigator treated two series of cases, one of seventy-one patients with lupus erythematosus and the other of fifty patients with psoriasis. The results on the whole were good, but permanent cures were obtained in only a small number. It is significant that direct aggravation of lupus erythematosus was not observed during the treatments. The author carried out complete histologic studies of different stages of the cutaneous reaction in normal skin by experiments on himself. An alcoholic solution of thorium X was painted on thin strips of tin foil and placed in direct contact with the skin for periods of from twenty-four to seventy-two hours and longer.

The changes observed were attributed to the action of alpha rays by contact and by penetration as emanation and very much resembled the changes produced by the roentgen rays, differing decidedly, however, in their more rapid appearance and quick, almost traceless disappearance in spite of apparent violent onset. Severe reactions produced cutaneous atrophy, without, however, damaging the glandular organs of the skin. The claims made for this mode of treatment are that it is easy, clean, painless and agreeable, and free from the risks of deep burns or other delayed harmful after-effects observed with the use of the roentgen rays or radium.

RADIUM TREATMENT OF CANCER OF THE LIP. H. LAMMERS, Acta Radiol. **2**:497 (Dec.) 1923.

This is a study of forty-seven cases in which treatment was given from 1915 to September, 1923, in which thirty-nine cures were recorded. Thirty-five of the patients were free from disease in September, 1923, and four had disappeared from observation. Two cases of recurrence responded to further treatment. Seven of the forty-seven patients grew worse under treatment; this included patients previously operated on or treated with the roentgen rays. In most cases, only the gamma radiation was used, and the radium was applied, heavily screened and in a plastic mold, for a day and a night. In a few cases, radium containing needles were injected into the tissue. Metastases were never observed to develop during or after the radium treatments, whereas they were observed in surgically treated cases.

BLOOD ANOMALIES IN RADIOLOGISTS AND IN PERSONS EMPLOYED IN RADIOLOGIC SERVICE. P. AMUNDSEN, Acta Radiol. **3**:1 (April) 1924.

A slight deviation from normal was observed in the leukocytes as manifested by a slight leukopenia and a relative lymphocytosis at the expense of the polymorphonuclear leukocytes. These changes were found one or two months after beginning radiologic work. The erythrocyte and hemoglobin findings were normal.

POSTOPERATIVE TREATMENT OF MAMMARY CANCER. T. LARSEN and E. LYSHOLM, Acta Radiol. **3**:8 (April) 1924.

A higher percentage of recurrences, terminating fatally, was observed when single massive deep doses of roentgen rays were employed over large areas than when series of comparatively small doses were administered.

A PLASTIC MEANS OF PROTECTION DURING ROENTGEN-RAY TREATMENT. S. ARNELL, Acta Radiol. **3**:66 (April) 1924.

A mixture of 1 part paraffin, with a melting point of 45 C., and 5 parts litharge (lead oxid) is applied about the cutaneous lesion to a thickness of about 1 cm.; 4.3 mm. of this material has been found to give the same protection to the skin as 1 mm. of lead plate. This material is plastic at body temperature and therefore easily applied. It can be readily sterilized, and its use is in no way objectionable to the patient nor impracticable for the operator.

H. R. FOERSTER, Milwaukee.

EPIDERMAL CANCER ON A SYPHILITIC BASIS. SCHWANK, Ceska Dermat. **5**:293, 1924.

A woman, aged 62, who during the last fourteen years had had several painful ulcers that healed without treatment on the proximal third of the right shin, developed in one of the scars an extensive lobular epithelioma. The Wassermann reaction was +++. Treatment was ineffective.

ULCERATING GUMMA OF THE INTERNAL CANTHUS. V. VEJDROVSKY, Ceska Dermat. **5**:296, 1924.

The patient was a girl, aged 19, with a negative past history and no evidence of primary or secondary lesions. The Wassermann reaction was +++. Besides a broken-down gumma of the internal canthus (seven months' duration), she presented iritis and an ulcerating lesion of the soft palate.

The lesion is interesting because of its rare location, a probable hereditary origin of the infection, and a strikingly prompt response to bismuth therapy. In three weeks, there was a complete disappearance of the lesion without any external scar, but with a narrowing of the nasal duct.

BISMUTH IN THE TREATMENT OF CONGENITAL SYPHILIS. J. SVEJCAR, Ceska Dermat. **5**:307, 1924.

Pure, precipitated bismuth suspended in physiologic solution is a valuable antisyphilitic in congenital cases, recommended especially on account of the painlessness and convenience of application (intramuscular injections). Contraindications are syphilitic anemia and atrophy.

LERICHE'S OPERATION IN DERMATOLOGY. A. JIRASEK, Ceska Dermat. **5**:325, 1924.

Leriche first recommended his operation—a periarterial sympathectomy—for trophic ulcers on extremities with traumatically severed blood supply and resulting vasoconstriction; later also for Raynaud's disease and hyperhidrosis. The operation attempts to interrupt the reflex arc in which there is a certain degree of irritation (hypertonus). The reported case illustrates the distant effect of severing the afferent branch.

A woman, aged 36, presented on the palms and volar surfaces of the fingers a thin, tense, bronwish-red skin with deep, bleeding fissures and hard yellowish scaling. Motion of the fingers was limited; they remained in a clawlike contracture. Hyperhidrosis and considerable pruritus were present. The condition had been getting worse for three years. The history was negative. Diagnosis was withheld, and Leriche's operation on the left brachial artery recommended. Three weeks after the operation all symptoms had practically disappeared on the left side, and there was considerable improvement on the right side. Three months after the operation, however, the left side was worse, while the right side continued to improve.

THE INFLUENCE OF IONS OF CALCIUM AND OTHER METALS ON THE GROWTH OF TISSUES IN VITRO AND THEIR RELATION TO THE PROBLEM OF CANCER. P. MENDELEJEVA, Ceska Dermat. **5**:357, 1924.

Clowes, Frisbie and Waterman analyzed carcinomatous tissue and found that it differed from normal tissue by a preponderance of potassium over calcium. The higher the concentration of potassium, the faster was the growth of cancer.

The author working with embryonal guinea-pig tissue arrived at different conclusions: calcium ions brought on in vitro a rapid proliferation of embryonal cells, while potassium and zinc ions tend to destroy the cells after forty-eight hours.

SPINKA, St. Louis.

DERMATOLOGIC ABSTRACTS

THE JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION

DIABETIC GANGRENE OF NOSE. E. S. CONNELL, Missouri State M. J. **21**:277 (Aug.) 1924.

Connell failed to find diabetic gangrene of the intranasal structures reported in the literature. His patient was 35 years of age and had suffered from diabetes for three years. He had grown slowly worse. In 1915, he had a nasal operation which he stated was a submucous resection of the septum, and an ethmoid operation. During the early part of December, 1922, he had an attack of influenza which was followed by an attack of acute purulent bilateral ethmoiditis. A few days later the infection extended into the right maxillary antrum and he developed an erythema and induration of the skin of the dorsum of the nose and upper lid of the right eye. The ethmoid infection gradually improved under treatment. Then an ulcer appeared on the right side of the cartilaginous septum. The next day this ulcer was larger, greenish black in color, with a very foul discharge. These changes increased until the ulcer perforated the septum, the cartilage and membrane sloughing away in

small masses. The perpendicular plate of the ethmoid and vomer began to slough away and the hard palate became perforated, establishing a communication between the mouth and the right maxillary antrum. The blood Wassermann reaction was negative. The patient went elsewhere to obtain insulin treatment. Eventually the sloughing ceased and apparently the necrotic areas healed.

CHAULMOOGRA ETHYL, PROPYL, BUTYL AND AMYL ESTERS. G. A. PERKINS, Philippine J. Sc. **24**:621 (May) 1924.

Experiments on the preparation of chaulmoogra ethyl, propyl, butyl and amyl esters are described by Perkins, in which the course of the reaction between chaulmoogra oil and the alcohol was followed by means of a refractometer. The proportion of two mols of the alcohol to one molecular equivalent of chaulmoogra oil was found to be sufficient for a practical conversion of the oil into the desired ester, using sulphuric acid (0.03 mol) as catalyst. Hydrochloric acid (0.03 mol) was found less desirable as a catalyst because it caused a different equilibrium value, presumably through different distribution in the two liquid phases. Practical equilibrium was found to be obtainable by boiling for a few hours, using dehydrated alcohols. The water in 95 per cent. ethyl alcohol was found to emphasize the separation of the reaction mixture into two layers, which disadvantage can be overcome by increasing the amounts of alcohol and acid and the time of boiling. Methods used at present for the preparation of chaulmoogra ethyl, propyl, butyl and amyl esters are described, and characteristics of these products given. A method is described for combining the ethyl esters with iodin in such a way as to diminish materially the irritating properties of this drug.

SYPHILIS OF THE BLADDER. C. A. and E. CASTAÑO, Rev. Asoc. Méd. Argentina **37**:5 (June) 1924.

The Castaños analyze a typical case in a woman, aged 33. The diagnosis was based on the pains and occasional hematuria, the ulcerative, papillomatous form of the cystitis with comparatively normal urine and the slight impairment of the general health in comparison to the bladder findings.

TREATMENT OF COMMON ACNE. B. NAVARRO CÁNOVAS, Siglo. méd. **73**:585 (June 14) 1924.

Navarro Cánovas reiterates that electrolysis and the roentgen ray are peculiarly effectual in curing acne and in restoring the normal aspect of the skin afterward. In one severe case in which no benefit had been realized from treatment by dermatologists in Madrid, Paris, Berlin and Vienna, the crops of acne recurring regularly every ten or fifteen days, there has been no recurrence during the months to date since the course of fourteen electrolysis sittings and roentgen exposures to a total of three skin units, all in fifteen weeks. Acne lesions seem to be peculiarly susceptible to the roentgen ray.

EOSINOPHILIA IN SCABIES. T. VENTURI, Policlinico, Rome **3**:803 (June 3) 1924.

Venturi found only inconstant relations between eosinophilia and scabies in 150 subjects. In more than half of them the percentage was normal or under normal. The cure did not seem to change the blood picture typically.

Society Transactions

PHILADELPHIA DERMATOLOGICAL SOCIETY

Regular Monthly Meeting, May, 1924.

F. D. WEIDMAN, M.D., *Presiding*

A CASE FOR DIAGNOSIS. Presented by DR. HIRSCHLER.

E. R., a boy, aged 5, white, was the third in a family of seven children. His personal and family history were negative. The present skin condition began four weeks before he was admitted to the Woman's Hospital on May 6, 1924. The patient had been residing with his family in Savannah, Ga., for one year, and had returned about three months before the eruption began. The mother had noted on the legs, just above the tops of his shoes, what appeared to be a slight thickening of the skin, with tiny "blackheads in the pores." Later the elbows and the forearms were inflamed; from then on, the child became progressively worse. He complained of fatigue; the mother thought that he had been having a slight fever. No medication had been given, except syrup of ipecac and squills. While in the South, the diet had consisted largely of pork, corn meal and okra, tomatoes and sweets. A physical examination by a pediatrician disclosed only a slight general glandular enlargement, most marked in the cervicals. Otherwise, except for the skin, the findings were negative. The skin presented the following points of interest: Both upper and lower extremities to halfway above the elbows and knees were covered with an ichthyosis-like rash, with marked desquamation of the hands and feet which were inflamed and swollen. A lesion on the back of the neck was also sharply marginated at the collar line. The exfoliation was branny to thick papules. Besides the before mentioned lesions, there were other pinhead-sized papules scattered on the trunk; diffuse on the face, back of the ears, inside the groins, scrotum and around the umbilicus, external parts of the thighs and lower buttocks. The mucous membranes were unaffected, except for dry and scaling lips. All the lesions were dry and harsh, most keratotic at the elbows, knees, palms and soles. There was no itching. The laboratory findings were negative.

The diagnosis of a late appearing acute ichthyosis suggested itself, as also that of pellagra.

DISCUSSION

DR. KNOWLES expressed the opinion that several conditions were indicated—seborrheic dermatitis, beginning pityriasis rubra pilaris, irritated keratosis palmaris et plantaris and the disease similar to ichthyosis described by the French, in which the symptoms were inflammatory.

DR. SCHAMBERG said that ichthyosis was a congenital deformity, although in some cases the manifestations appeared later; in this case, there was a history of an acute condition of relatively recent origin. Some of the patches would pass very well for ichthyosis but other conditions were present. He

believed that the case should be carefully watched from the point of view of pellagra. The patient had had a marginated dermatitis on the extremities, and it was sharply marginated around the neck. There had been inflammation over areas exposed to the sun's rays, and now a profuse desquamation was taking place in large flakes, and the patient had an elevated temperature. Gastro-intestinal disturbances were lacking. The patient, moreover, had lived in the south. It was impossible to make an absolute diagnosis at this time. It was an interesting case and deserved thorough study and observation.

Dr. Weidman said that he thought it was a mixed eruption in the sense of Brocq—in two diseases present, there was one which was recessive but which tended to alter the outstanding, conspicuous disease. The recessive phase in this patient was a seborrheic dyscrasia. As to the other phases, he did not think we shoud overlook the possibility of its being a rather localized type of dermatitis exfoliativa. He agreed with Dr. Schamberg that the case should be watched. Dr. Weidman said that he was much in sympathy with Brocq's conception of the "mixed eruptions," and he thought that it would clear up many otherwise puzzling situations. There might be a possibility of erythroderma of tuberculous origin, it very often being a difficult matter to find definite lesions in the chest.

Purpura Annularis Telangiectodes? Deep Vascular Naevus. Presented by Dr. Greenbaum.

S. H., a woman, aged 22, white, married, was healthy during infancy until the age of 15 months. At that time, she apparently had diphtheria, and the antitoxin given was blamed for the resulting eruption. Soon after, there was swelling of the entire right upper and lower extremities. An eruption has been present ever since on both parts. On examination, the patient presented extensive red, purpuric-appearing areas on the right upper and lower extremities and over the buttocks. Some lesions appeared still to be purpuric, as they did not disappear on pressure. There were areas of faint pigmentation suggesting disappearing purpura. No telangiectasis was apparent, but annular areas, that is, areas embracing clear skin, apparently normal, were seen here and there. The right upper extremity was twice the size of that part on the left.

DISCUSSION

Dr. Schamberg remarked that his first impression of the case was that it was one of purpura annularis telangiectodes, but another possible view of the case must be considered. According to the history, the condition developed when the patient was aged 1½ years; it was limited chiefly to the right leg, accompanied by enlargement of the subcutaneous tissues of the arm; it is quite possible that we were dealing here with an ordinary nevus. We often observe nerve distribution in nevi, and persistent swelling of the arm might be due to enlargement of subcutaneous veins such as we see with nevi. There seemed to be no atrophy, and there was no distinct annulation of the lesions. The speaker was inclined to make the diagnosis of nevus; he suggested the use of carbon dioxid snow on the arms, and the use of pressure on peripheral vessels and deep veins by means of a bandage running from the wrist up.

Dr. Weidman said that his impression was that it was a case of angioma serpigenosum, i. e., so far as appearance alone was concerned, but when the

clinical evidence was added he felt inclined toward angiomatous nevus. Basically, it was probably similar to lymphangioma circumscriptum, but differed in that the blood vascular phases predominated over the lymphatic ones in this case; this was just the reverse of lymphangioma circumscriptum.

Dr. Greenbaum said the case when first seen was suggestive of purpura annularis or deep vascular nevus, but the vascularity did not disappear on pressure, and if it were nevus, one would have to consider hemorrhages from marginal blood vessels.

Dr. Hirschler asked whether the condition would be likely to change in color if it were angioma—she thought it would change more if it were.

Von Recklinghausen's Disease. Presented by Dr. Schildkraut.

M. D., a woman, aged 21, white, single, ten years ago developed freckle-like spots on the neck, which slowly extended and increased in number until the entire trunk was covered. They varied in size from that of a pea to that of a palm. Eight years ago she developed two pinkish, soft tumors on the sternum, about the size of a hickory nut. About a year later, she developed three or four nodular growths on the back, and three years ago one on the chin. The patient was of normal mentality.

DISCUSSION

Dr. Schamberg suggested a basal metabolism test and a study of the endocrine glands.

Hypodermic Scars in a Tuberculous Subject. Presented by Dr. Weidman.

J. K., a man, aged 55, white, a morphin habitué, brought from the tuberculosis ward of the Philadelphia General Hospital, showed a condition on the left arm which was much more marked when seen in daylight and which probably was the result of hypodermic injections. Several years previously there had been ulceration at this point. There were now several fine keloidal bands in a pigmented patch. The case was presented because he wished their opinion as to whether the scar bore characteristics of previous (inoculation) tuberculosis. The presenter felt that it did not.

DISCUSSION

Dr. Schamberg said that he did not think there was any evidence of a tuberculous condition.

Dr. Hirschler said he was of the opinion that it possibly was atrophy following inflammatory eruptions from hypodermic injections not necessarily any other injection.

A Case for Diagnosis. Presented by Dr. Wright.

A woman, aged 27, colored, had been seen for the first time on the day of the meeting at the Polyclinic Hospital. She presented fairly numerous lesions on the arms and trunk and also a few around the vulva. The lesions were annular, and around the borders were a number of elevated, purplish papules, flat-topped and suggestive of annular lichen planus. The condition first began at the age of 3. Dr. Wright said that he could not account for the areas of deep pigmentation. Two Wassermann tests had been negative.

DISCUSSION

Dr. Knowles said that we should have to distinguish here between syphilis and tuberculosis. Some lesions were like those of secondary syphilis, bordering on tertiary.

Dr. Greenbaum said that he thought it was a case of lichen planus, typical papules of lichen planus being present. He had first thought of the condition on the back as secondary syphilis of follicular type, but the objective appearance of the lesions around the vulva was that of lichen planus.

Dr. Hirschler remarked that those who had not seen the genital lesions were at a disadvantage. The lesions on the trunk were certainly suggestive of a tuberculous type of some description. They seemed to be firmer and deeper and more translucent than lichen planus.

Dr. Schamberg said he thought that while there were some lesions that suggested lichen planus, he believed also that other lesions were too deep and nodular; if no report of a negative Wassermann test had been given, most of us would have regarded the condition as an intermediate syphilitic eruption. His opinion as to treatment was that it would be wise to give antisyphilitic treatment in spite of the negative Wassermann tests.

Dr. Weidman said he thought that the diagnosis lay between chronic granuloma, of unknown nature and syphilis. The marked translucency and the rounded, knobby summits would exclude lichen planus. He and Dr. Klauder had been studying a similar case, which they had followed for more than a year under favorable hospital conditions, and in which syphilis and tuberculosis were excluded. There are other granulomas than those of syphilis and tuberculosis, and some day we shall find an organism, or some other agent, that will give a lesion similar to that of syphilis and tuberculosis, without giving a positive Wassermann or typical tuberculous tissue reaction.

Juvenile Tabes. Presented by Dr. Klauder.

A girl, aged 12, white, presented an optic atrophy, with subjective symptoms of pains radiating down both legs. This patient had Hutchinson's teeth and a prominence of the frontal bones. The right pupil was dilated and fixed and the left irregular and sluggish. Both nerve heads were white, with narrowing of the temporal vessels. A Wassermann survey made of the entire family had been reported negative. The child was in the third grade at school and was very alert mentally.

Dr. Weidman asked whether there was any history of syphilis or any previous infection. The question of the possibility of syphilis being carried down to the fourth generation was generally discussed for personal information.

Dr. Klauder expressed the opinion that it was rare, but possible.

Dr. Schamberg remarked that cases of syphilis in the third generation were well substantiated, but in the fourth, doubtful. One must have conclusive evidence that neither the father nor the mother had acquired it. Theoretically, it was conceivable that the spirochete of syphilis might be in the tissue of the ovary or of the testicles and might be transmitted.

Dr. Weidman said that he did not think the case could be proved except by animal experimentation, syphilis was so ubiquitous that there was a perfectly good chance of its appearing in the fourth generation without straining at an hereditary explanation.

Dr. Schamberg also said that we must realize that patients can acquire syphilis, and never have any external manifestations until a nodule might appear on the skin thirty years later, or there would be vascular or nerve disease. It was impossible without study and surveillance of these cases by physicians over a period of years to know that the condition had actually been transmitted through several generations.

Dr. Klauder said in regard to this case that the outlook was hopeless.

Dr. Knowles said that he was of the opinion that optic atrophy contraindicated the use of tryparsamide, and spoke of Dr. Stokes' paper to be read before the American Dermatological Society, pointing out the danger of the drug in optic atrophy due to syphilis.

Dr. Klauder said he thought that the drug was of particular value in tabes with optic atrophy.

Dr. Greenbaum remarked that he thought it impossible for any drug to have effect on a degenerated nerve.

Dr. Schamberg said that he thought Dr. Klauder's view a reasonable one, he realized the very important contraindication to the use of tryparsamide in optic nerve disease. By reason of the fact that tryparsamide has an affinity for the optic nerve, the said structure might be influenced. It might hasten the complete extinction of the sight, or on the other hand, it might conceivably do good.

There is very little chance that the child will escape blindness without treatment; he would suggest that Dr. Klauder secure the opinion of a neurologist who might fortify him in this course. The treatment may do harm, or it may do good and the desperate nature of the condition would seem to justify a trial.

Morphea. Presented by Dr. Corson.

A woman, aged 56, white, a native of Poland, came to the Jefferson Hospital Dispensary on the day of the meeting. She had been the mother of fifteen children, eight of whom are living. Her occupation was housework and laundry work. Three months before presentation, an eruption of an intertriginous type appeared under the left breast, progressing to the groins, axillae and other situations, where two skin surfaces were apposed. In the center of each of these inflamed areas, there was a central, scarlike patch that was soft and thin, but which was bordered by a violaceous margin.

DISCUSSION

Dr. Hirschler said that she thought it seemed to her as though the lesions on the breast were marked telangiectases. The lesions around the waistline appeared to be the same thing, probably due to pressure of bands around the waist. Most of the central areas resembled morphea.

Dr. Schamberg said that he agreed with Dr. Hirschler in the diagnosis that the lesions represented those of morphea. The patches around the flanks were smooth and showed a rosy halo. The constriction of the waist band may have brought about the linear bands. Along the breast, there were linear lesions that suggested "white spot disease," which is closely related to circumscribed scleroderma.

SYPHILITIC MACULAR ATROPHY (ROUND VERGETURES) AND NEO-ARSPHENAMIN DERMATITIS TREATED WITH THIOSINAMIN. Presented by DR. GREENBAUM.

A man, aged 24, white, received nine injections of neo-arsphenamin. After the last injection he developed a marked generalized pruritus. He was inadvertently given a tenth injection; forty-eight hours later he developed facial edema, almost severe enough to close the eyes, with a generalized, dull red, erythematous eruption, fever and intermittent but marked pruritus. Treatment was started four days after the onset of the symptoms. Daily intravenous injections of thiosinamin were commenced. There was subjective and objective improvement within twenty-four hours. By the fifth injection, there was definite feeling of physical well being. The itching was almost gone. Desquamation began ten days after treatment had been instituted, and in three weeks the skin was normal.

DISCUSSION

DR. SCHAMBERG said that he thought that thiosinamin which Dr. Greenbaum had introduced in the treatment of arsphenamin dermatitis was producing encouraging results. It contains sulphur, and he believed it was going to be of distinct value. It will require further testing, for some cases, with or without treatment, clear up more rapidly than others.

DR. WEIDMAN raised the question whether, being essentially the same thing as fibrolysin, the same objections should not be raised to thiosinamin, i. e., that it destroyed fibrous tissue which might be needed for protection, etc. This should be controlled.

A CASE FOR DIAGNOSIS. Presented by DR. WEIDMAN.

F. O., a woman, aged 43, white, had had papules of acneiform distribution for five months, and stated that the eruption was also present at one time in the axillae. The papules were rather uniformly spaced on the face, and of uniform size, translucent and a dull red. Some were also present on the lower lids. The skin was not erythematous. The patient had taken a two weeks' course of nerve medicine two months before the eruption occurred and had taken none since.

DISCUSSION

DR. KNOWLES said that he felt inclined toward acne rosacea.

DR. WRIGHT said he thought that the majority of lesions were those of acne rosacea, some on the lower eye lids were possibly hidradenomas.

EPITHELIOMA. Presented by DR. DENGLER.

V. M., a man, aged 34, white, about eight years ago noticed a growth about the size of a split pea over the upper part of the right tibia. The growth was not painful except when injured. The color at first was of a more or less pearly character. During the last two years it had increased in size to that of half a nutmeg. The color had changed to a distinct redness. The growth was movable.

DISCUSSION

DR. WRIGHT said he thought that clinical appearance was that of a fibrosarcoma and did not feel that it should be temporized with, but removed by excision.

Dr. Knowles remarked about the long duration, and said that since the color was extremely bright red instead of dark red, it might be a form of contagiosa molluscum. There was a pustule in the center.

Dr. Weidman felt that it was a fibrosarcoma.

Blastomycosis. Presented by Dr. Weidman.

J. R. T., a man, aged 56, a native of England, had a scar on the back of the right hand at the site of a curettement by Dr. M. B. Hartzell and Dr. Davis thirty years before presentation. The condition was finally diagnosed as blastomycosis. There had never been any subsequent lesions, and no active lesion was present at the time of the meeting, only a white scar. This was the original case of blastomycosis.

DISCUSSION

Dr. Knowles said Dr. Hartzell made sections of the first case found, and several pathologists examined these sections, but no definite conclusion was reached. Degenerative cells were suggested as the explanation of the bodies seen. That year, the patient went to Gilchrist in Baltimore, and the latter with the aid of Dr. Welch, discovered the organism causing the disease.

Lupus Erythematosus and Lupus Pernio. Presented by Dr. Schildkraut.

M. L., a girl, aged 13, white, gave a family history that was negative, except that an uncle had died from tuberculosis. Three years ago a reddish spot appeared on the left cheek, which spread, joined other spots and assumed the typical appearance of lupus erythematosus. Two years before, a papular eruption appeared on her hands. It consisted of a number of slightly elevated, pea-sized spots, bluish-red, with depressed scaly centers on the fingers and backs of the hands. A few months ago, an eruption came out on the scalp. This was of the type seen on the face.

Experimental Herpes in Rats, Guinea-Pigs and Rabbits. Presented by Drs. Greenbaum and Harkins.

This was the first instance, to their knowledge, that herpes virus has been experimentally produced in rats.

DISCUSSION

Dr. Greenbaum presented a rabbit with herpetic keratitis, inoculated four days before with pus from another rabbit. This condition had been found in rabbits and in guinea-pigs, but never in rats. There was a marked keratitis and possibly pus in the anterior chamber. Later it would deveolp into a marked pustule. The rabbits would die of herpetic encephalitis.

Dr. Schamberg said that this whole subject of the virus of herpes, which, while innocuous to human beings, could produce an intense and fatal infection in animals, was one of the most astounding revelations in dermatology in recent years. Clinical herpes was a trivial affection, yet when the virus was inoculated into rabbits and also other animals, it produced a virulent ascending nerve involvement with encephalitis similar to that of sleeping sickness. The opinion was held by Dr. Flexner of the Rockefeller Institute that the virus of herpes was closely related to that of lethargic (epidemic) encephalitis. No organism had been cultivable on ordinary mediums. Here was a virus of a cutaneous disease with definite lesions, leading to fatal changes of the nervous system.

Patricia Hart-Drant, Secretary.

NEW YORK ACADEMY OF MEDICINE, SECTION ON DERMATOLOGY AND SYPHILIS

Regular Meeting, May 6, 1924

PAUL E. BECHET, M.D., *Chairman*

A CASE FOR DIAGNOSIS: ANGIOMA SERPIGINOSUM? Presented by DR. THRONE.

E. L., aged 28, presented lesions which had existed for approximately four and a half years. One, on the right cheek, was about 4 by 2½ inches (10 by 6.5 cm.) in size; it showed pigmentation, telangiectasia and small angiomas. On the left cheek was a similar but smaller lesion. The bridge of the nose and malar eminences showed telangiectasia. The probable diagnosis was angioma serpiginosum.

DISCUSSION

DR. HIGHMAN said that he agreed with Dr. Throne.

DR. LEVIN said he thought that a diagnosis of lupus erythematosus should be considered because of the color, the adherent, superficial, grayish white scales, the location of the patches, and also because of the presence of dilated pilosebaceous follicles containing keratotic plugs.

PURPURA HEMORRHAGICA "PAPULATUM." Presented by DR. FELDMAN.

A. S., aged 3, developed an eruption about eighteen days before presentation, which started on the hands and feet and spread upward. The mother said that the child was not ill at any time after the appearance of the rash, and that the course of the disease was entirely afebrile. The family physician assured her that it was not necessary to treat the child. The patient was brought to the Bronx Hospital in the afternoon of May 6, 1924, and examination revealed an eruption of red papules, some of them shiny and lichenoid in appearance, thickly covering the extremities. On the dorsum of each foot, the lesions were distinctly hemorrhagic. There was also an eruption of macular purpuric spots on the upper portion of the chest. The temperature was 102 F. There was a mild pharyngitis, and the spleen was not enlarged. There was no evidence of joint enlargement. A systolic murmur was present at the apex. The tourniquet test for purpura was positive.

DISCUSSION

DR. POLLITZER said that he had been interested in the case but could not come to any definite conclusion about it on account of the inadequacy of the opportunity for examination. He was inclined, however, to think that it came under the group of the exudative erythemas—that it was an erythema papulatum. The hemorrhages were a purely secondary matter, most marked on the extremities, and occurring after pressure. The history of the case rather supported the idea of some general toxic process—the swollen glands preceding the eruption by a short time might well have been a factor in the causation.

DR. HOWARD FOX said that he agreed entirely with all that Dr. Pollitzer had said.

DR. FELDMAN also said that he agreed with what Dr. Pollitzer said—he had simply put the case down as purpura hemorrhagica for lack of a better name. He thought that the disease belonged to the erythema multiforme group,

but pointed out that there were distinct purpuric lesions without any papules. This was especially true on the upper portions of the chest. In spite of the fact that the child had no joint involvement, there was a cardiac murmur which had developed recently. As the etiology of both conditions was probably alike, this case was perhaps a combination of the two.

A CASE FOR DIAGNOSIS. PELLAGRA? Presented by DR. BECHET.

P. M., a man, aged 49, born in the United States, had come to Dr. Trimle's service at the University and Bellevue Clinic a few days previous to the meeting. He said that for some months he had not felt well. He had suffered from diarrhea, which had been present for four or five weeks. He was weak and complained much of lassitude; he also said that his mouth was sore. On the backs of the hands, wrists and phalanges, sharply defined, dusky red, erythematovesicular patches were discerned. On the cheeks were two dusky red desquamating patches. He said that they burned and itched considerably. The patient had been living in New York for five years.

PELLAGRA. Presented by DR. PAROUNAGIAN. (Courtesy of Dr. Norrie).

J. B., a man, aged 30, single, Irish, a laborer, applied for admission to Bellevue clinic on April 30, 1924. He had been in the United States thirteen years, one an one-half years in Germany, two months in Georgia, six months in camp at Chickamauga and in New York City since 1920. His present illness began about three weeks before presentation; an eruption appeared on the dorsal aspects of both hands, scaly and dark brownish; then the nose and left side of the face, the lips and the mouth were affected. The entire mouth was raw, the mucous membrane denuded, the tongue bright red and inflamed. He complained of severe diarrhea and nervous exhaustion. On these facts, the diagnosis was established.

PELLAGRA. Presented by DR. PAROUNAGIAN.

A. A., a woman, aged 42, single, born in the United States, was seen for the first time at the Bellevue clinic on May 5, 1924. She was born in Brooklyn, and had never left the city, except for a brief period spent in Pennsylvania. She had never been in the South. Examination revealed dark brownish patches on the dorsum of both hands; the mucous membrane of the mouth and tongue was inflamed and the epithelium denuded. The patient was nervous and complained of gastric symptoms (diarrhea). This was the second case seen in their service within one week. The result of the Wassermann test had not yet been reported. The duration of the condition was said to have been three weeks. There were no other lesions except those of the mouth and the hands.

DISCUSSION

DR. GOODMAN answered the Chairman by saying that he had seen the two cases. He thought the diagnosis should be questioned rather than have the two cases go on record unopposed. It would be a rarity to have cases of pellagra in New York City. As far as he knew, only three cases had been reported—that of MacKee, that of Wise and one from the Vanderbilt clinic. Examination of the man would lead him to make a diagnosis of erythema multiforme bullosum. The lesions in pellagra were uniform, symmetrical and the limitation on the forearms almost pathognomonic. Certainly the last

characteristic was absent in the case of this man. The back of the neck and the scrotum were free from lesions. The short duration, three weeks, was hardly long enough for the skin lesions of pellagra to reach such dimensions, although the time of appearance was variable. The associated symptoms of pellagra, the three d's—dermatitis, diarrhea and dementia—need not all be present at one time, and the fact that the male patient was possibly psychopathic did not militate against the diagnosis of erythema multiforme. Dr. Goodman said that so far as the skin condition was concerned, pellagra sometimes began with lesions much like those of erythema multiforme, and it was possible that the two cases might later show true pellagra.

Dr. Bechet said that in the case he had shown for diagnosis, there was deep pigmentation on the face and hands.

Dr. Howard Fox said that he felt doubtful about the diagnosis of pellagra in the two cases. The eruption on the hands did not have the classic sharp border and marked symmetry observed in this disease. The eruption alone he thought would not suggest pellagra. Regarding the other symptoms mentioned, he said that one of the patients (the woman) had said that she had had diarrhea following the taking of a cathartic. He was inclined to think that both of these patients were suffering from an erythema multiforme. He agreed with Dr. Goodman in his opinion that the patients were not pellagrins, but he did not agree with the remark about the eruption always being dry. He had seen so-called "wet" cases in his experience in the south.

Dr. Pollitzer said he agreed that the skin lesions should not be regarded as of primary importance in the diagnosis of pellagra, but we do expect when we have skin lesions that they should conform to certain definite characters. One feature about the dermatitis of pellagra was absolutely characteristic and obtained whenever cutaneous lesions were present on the hands—the sharp limitation of the dermatitis and its termination in an oblique line above the wrists. He had questioned the woman closely about her general symptoms, and she said that she had had no trouble with her bowels until recently when she had severe diarrhea for two days after taking a pill. It was easy to understand that in the hurry of examination in a public clinic or dispensary one could easily get an erroneous impression, but this woman had not the general symptoms of a pellagrin, and the cutaneous lesions were not those of pellagra; the tongue might be pellagrous, but it might also indicate some other condition, and he very much doubted that the diagnosis of pellagra was correct. Dr. Pollitzer said that these remarks might apply with equal force to the man, except that he had decided diarrhea and seemed a little below par mentally, but whether he was always so or not, he did not know. In that instance also, he very much doubted the diagnosis of pellagra.

Dr. Parounagian said that both patients had such severe diarrhea that they were receiving tincture of opium deodorized, and bismuth subcarbonate to control it. Dr. Parker, the resident physician, who was present could substantiate this statement. As to the bullae on the backs of the hands of the man, Sutton said: "In very acute cases bullae may form." Both patients had dermatitis on the backs of the hands and faces, extensive lesions of the mouth and tongue and diarrhea, and the male patient had marked mental symptoms. The female patient had dermatitis about the genitals, and the vulvar lesions resembled the lesions in the mouth. As to the so-called atrophied skin and sharply defined dermatitis on the backs of the hands, he believed the cases were too acute, as both were of three weeks' duration, and as the disease

advanced the same condition was likely to prevail. Dr. Parounagian believed that both cases were pellagra. He also said that Dr. Norrie and Dr. Symmers of Bellevue Hospital had seen the cases, and they concurred in the diagnosis of pellagra.

(Since the presentation of the foregoing cases, Dr. Parounagian had seen three more cases at Bellevue Hospital. One of these patients had died one week after admission, making a total of five cases in less than four weeks.)

Dr. Bechet said that his patient definitely showed sharply defined, erythematovesicular, dusky red patches on his hands and wrists, as well as on the face. Diarrhea, lassitude and stomatitis were well marked. These facts warranted the consideration of pellagra as the diagnosis. He was not, however, certain of that diagnosis.

Parapsoriasis Erythrodermie Pityriasique en Plaques Disséminées. Presented by Dr. Levin.

R. A., a woman, aged 22, married, born in Russia, said that she had had the eruption for six months. It was not accompanied by itching. She presented on both upper and lower extremities, markedly on the flexor surfaces, several large red superficial lesions, with fine scaling and no tendency to infiltrate. There were also on the flexor surfaces of the forearms numerous pinhead to pin point sized shiny papules. On the trunk and breasts, there were several lesions similar to those on the lower extremities. The Wassermann test was negative. The urine contained traces of albumin and oxalate crystals, but otherwise was normal. The blood count showed: erythrocytes, 3,750,000; leukocytes, 5,600; polymorphonuclears, 55 per cent.; mononuclears, 45 per cent., and color index, 1.08. The gynecologic examination revealed an adherent uterus with cystic ovaries.

DISCUSSION

Dr. Scheer said that he agreed with the diagnosis.

Dr. Levin said that he had first seen the patient about ten days prior to presentation, and he considered the condition parapsoriasis. However, it was not a typical case, and he was surprised that the diagnosis was so readily accepted. On account of the superficial character of the lesions, their resistance to treatment and the absence of itching, a diagnosis of parapsoriasis was made. Dr. Wallhauser had pointed out the fact that the presence of small shiny papules, which was the condition presented in this case, was indicative of parapsoriasis.

Atrophia Cutis. Presented by Dr. Feldman.

S. B., a woman, aged 48, married, had one living child and she had had no miscarriages. About three years before presentation, she noticed that her forearms, wrists and the backs of her hands became red. Two years before, an itching eruption appeared in the same location as the reddened areas. She first came to the Bronx Hospital for treatment in the beginning of January, 1924. At that time, there were eczematoid lesions in the localities described. A bluish coloration, however, was visible through the eczema patches. Wherever the latter had cleared up subsequently, cigaret paper-like atrophy remained. The color was originally bluish purple. This pigmentation had now disappeared from one extremity, where the atrophied skin had again assumed a normal color. Shortly after the patient came to the clinic, an eruption of psoriasis appeared on her body. In addition, she had rosacea with acne, a cavernous angioma on one of the proximal phalanges and several small keloids.

DISCUSSION

DR. WOLF said that he had noticed also a beginning erythema on the patient, and had called Dr. Feldman's attention to it.

BRASS DERMATITIS. Presented by DR. LEVIN.

W. J. A., a man, aged 40, married, a machinist, had been troubled for five years with inflammation of the skin of the hands and feet. He entered the clinic on March 26, 1924. An examination at this time revealed an erythematous, vesicular, thickened, itchy and scaly condition, most marked on the hands and feet, gradually decreasing as the trunk was approached. Examination for fungi was negative. The condition had improved under application of Whitfield's ointment.

DISCUSSION

DR. CANNON said that when he had first seen the patient, he had a generalized moist dermatitis, which later became dry; it was of the exfoliative type, with a hyperkeratosis of the soles and palms. The diagnosis was an arsenical dermatitis occurring in a brass worker. He was treated with soothing lotions and Lassar's paste, and the condition improved greatly. When discharged, he had only the thickening of the soles and palms which he showed at presentation.

DR. LEVIN said that it had been suggested that the lesions had been produced by arsenic. The absence of all signs of general and local arsenic poisoning opposed this theory. The cutaneous lesions occurred only on the upper and lower extremities and on those sites where the oil could penetrate to the skin, due to the man's occupation. The lesions were not hyperkeratotic, but the whole condition was made up of parakeratotic and vesicular changes. As for the presence of arsenic, this might be found in normal persons. The condition was produced by the metal being carried with fine particles of oil into the hair follicles, and then causing dermatitis or eczema. The patient himself said that his overalls were always soaked with oil and grease, and he believed that the eczema of the thighs and legs was produced as a result of the wearing of dirty, oily overalls.

DR. POLLITZER said that the man was engaged in a brass foundry. Did he deal with brass filings or only with solid or molten brass? There was a great difference, for the dermatitis might be caused by fine particles of brass filings carried in by oil, or it was possible that the condition was caused solely by dirty oil and had no connection with brass.

DR. LEVIN said that the man had said that he had filed and cut down brass, and during his occupation he was sprayed with oil carrying fine particles of brass.

DR. CANNON said that brass is an alloy essentially of copper and zinc. Zinc contained arsenic. He said that an abnormal quantity of arsenic had been found in the urine, feces, scales and blood taken from the man.

LICHEN PLANUS WITH LESIONS OF THE SCALP. Presented by DR. LEVIN.

W. M., a boy, aged 15½, a high school student, had an eruption of five weeks' duration. He first noticed the lesions on the trunk. They were accompanied by slight itching. At the end of a week, he noticed that the spots were appearing on the extremities. He presented a few characteristic lesions of

the disease on the trunk, extremities and penis. On the back of the head, there was an irregular, elevated, violaceous patch, about the size of a half dollar, which was scaly and showed within its border distinct lesions of the condition.

DISCUSSION

DR. CHARGIN said that he agreed with the diagnosis. In daylight, one could clearly see the typical lichen planus papules, of characteristic color, arranged in small circles with clear centers; in other words, annular lichen planus. The body presented typical lichen planus lesions on the arms, penis and scrotum. Dr. Chargin said that this was the first case of lichen planus of the scalp that he had ever seen.

DR. HIGHMAN said that the lesions on the scalp looked like those of lichen planus.

DR. LEVIN said that the case was most interesting because of the unusual presence of lichen planus of the scalp. When the patient first presented himself at the Mount Sinai clinic, he showed distinctly irregular, silver dollar-sized, violaceous patches, with outlines typical of lichen planus lesions. The lesions had been somewhat modified by treatment, but the characteristic shiny appearance was still present.

DERMATITIS EXFOLIATIVA, FOLLOWING PSORIASIS. Presented by DR. ROSTENBERG.

J. S., a man, aged 29, born in Russia, gave an irrelevant family and past history. He said that he had suffered from psoriasis since he was 10 years old. Two years ago, while living in Mexico, he received one arsphenamin injection for his psoriasis, after which he developed a severe case of exfoliative dermatitis which lasted about three months, after which the psoriasis recurred, more severe than before. He came under observation at the beginning of January, 1924. He then had an extensive case of psoriasis, involving the entire body and also the face and scalp. As he had had the usual ointment treatment, which he claimed had never had any results, he was given roentgen-ray treatment, receiving in all one and a half units of roentgen ray in weekly fractional applications. At first he improved, but after having received about three-quarters of a unit, he grew worse than he was at the beginning of the treatment. He then received one exposure to the Alpine sun light, at a distance of 30 cm., for two minutes. During all this treatment, he was not given any salves or internal medication. A day or so after the Alpine sun light treatment, he complained of a severe burning and itching all over his body, and chilliness and nausea. On examination, a severe dermatitis was found, the psoriatic lesions being undermined by a foul smelling seropurulent exudate. The patient was removed to the hospital. He then had a temperature of 104 F., a rapid pulse, and symptoms of a beginning bronchopneumonia, which fully developed, being confirmed by physical and roentgen-ray examination. Blood chemistry revealed: sugar, 0.1 mg.; urea, 19.4 mg.; creatinin, 2.2 mg.; uric acid, 2.5 mg. Blood count revealed: 5,000,000 red cells; 80 per cent. hemoglobin; 6,220 white cells; 64 per cent. polymorphonuclears, and 36 per cent. lymphocytes. The urine was negative for sugar, albumin and arsenic. The skin began to desquamate profusely, peeling in large and thick flakes. After about two weeks, he began to lose the nails of the fingers and toes, and developed a total alopecia. The scales were also examined for arsenic, but none was found. The patient received in addition to a routine treatment for pneumonia a course of intravenous injections of sodium thiosulphate in ascending doses, as recommended

for a case of arsphenamin dermatitis. He responded favorably to this treatment; the temperature subsided, and the desquamation gradually ceased, leaving a marked erythroderma from which he was still suffering.

TUMORS FROM INJECTIONS OF SOLUBLE MERCURY. Presented by DR. LEVIN.

H. F., a man, aged 45, a Russian, a tailor, had had typhus at the age of 7 and gonorrhea at the age of 18. Fifteen years before presentation, he had a penile chancre followed by secondary manifestations. He received injections of mercury, four times a week, for a period of two years; and six intravenous injections of arsphenamin in 1917. He said that the tumors which he presented appeared several years before over the sites of the injections of mercury. The left buttock near the sacrum showed a deformity consisting of an orange-sized globular tumor, projecting upward and inward over the midline. This was smooth and stony hard, situated in the deep subcutaneous region and movable over the bone. It was not painful or tender. The right buttock in its upper inner quadrant showed a similar but smaller tumor. The Wassermann test of the blood was doubtful two months before. Since then, he had received four intravenous injections of arsphenamin, and six intramuscular injections of mercury.

DISCUSSION

DR. LEVIN recapitulated the history, and said that Oppenheim described three cases in 1913.

DR. GILMOUR said that the lesions were near the median line, near the sacrum, and he had seen none situated away from the sacrum. The condition consisted of one tumor with many lobules. It would be well to consult a surgeon in order to determine whether there was any possibility of its being a dermoid.

DR. LEVIN replied to Dr. Gilmour's suggestion of dermoid cyst, that the condition had appeared subsequent to the injection of mercuric cyanid. It was not a congenital condition, nor did it bear any relation to the bones or the spinal column. The skin over the tumor was movable and the tumor could be moved on the deeper structure. Two tumors were present, one on the right and one on the left side, and they were situated at the sites where some syphilologists preferred giving the patients injections of mercury. This type of tumor had been described by Oppenheim as devoting subsequent to irritation of deep tissue by injections of drugs. Oppenheim, in 1913 and 1914, discussed the development of similar tumors subsequent to injections of drugs like iron, arsenic and mercury. As to the suggestion of the presence of lobules, there was none present. Each tumor consisted of a single solid hard mass.

GENITAL CHANCRE WITH POSITIVE DARK FIELD. FACE TUMORS. RHINOPHYMA? MYOMA? Presented by DR. PAROUNAGIAN.

C. L., a man, aged 40, born in Russia, came to the Bellevue Syphilis clinic with a chancre at the coronary sulcus of eight days' duration, on April 17, 1924. The dark field was positive, and the Wassermann test was reported negative. The patient was placed under energetic antisyphilitic treatment. The condition of the face had been present for the past sixteen years. About twelve years ago, two lesions on the right side of the face and nose had been excised, although the lesion on the nose had recurred. The lesions were symmetrically arranged on both sides of the flush area, as somewhat elevated and irregular tumors. There were a number of comedones, firm to the touch. The patient complained of neither pain nor discomfort.

DISCUSSION

DR. POLLITZER remarked that the unusual feature of the case was the relatively large number of tumors on the cheeks; there were more than on the nose itself. There was no doubt of the diagnosis of rhinophyma.

DR. HIGHMAN said that he saw the patient for only a few minuntes, but clinically the case looked like rhinophyma; if it were not, the microscope would reveal this.

TERTIARY SYPHILODERM OF THE FOOT (SYPHILITIC KERATODERMA). Presented by DR. PAROUNAGIAN.

P. H., a man, aged 36, single, born in the United States, gave a history of meatal and sulcus sores nineteen years ago, which were treated locally. He received one arsphenamin and two intramuscular injections about twelve years before presentation. His present foot affection was of about nine years' duration, located on the dorsal and plantar aspects of the right foot, but more marked on the plantar surface. The borders were circinate, irregular and somewhat warty (keratotic). The dorsal aspect had a number of small nodular lesions with verrucous lesions on the toes. The dorsum of the foot was swollen and angry looking, and the patient complained of considerable pain. The Wassermann test was reported negative, although the clinical appearance was sufficiently characteristic to justify the administration of arsphenamin on May 2, 1924. A provocative Wassermann test was made the day before presentation. Subsequently to the second application, the ulcer became cleaner, the discharge of pus diminished, and since then the ulcer had closed in and become smaller.

DOUBLE CHANCRE OF THE LIP (UPPER). Presented by DR. PAROUNAGIAN.

W. H., a colored man, aged 26, born in the United States, was admitted to the Bellevue Syphilis clinic on April 9, 1924, with double chancre on the upper lip. He denied previous venereal history, although he acknowledged association with a young woman for several months. This woman also exhibited a sore on the lower lip, which appeared to be of longer duration. The dark-field and Wassermann examinations were positive for the man as well as for the woman. There was marked swelling of the submaxillary glands on the right side in the man, which was not present in the woman. Both patients were under active treatment, and there was marked improvement.

AMPUTATION OF PENIS IN A SYPHILITIC PERSON. Presented by DR. PAROUNAGIAN.

F. C., a man, aged 46, married, born in Poland, said that fifteen years before presentation, sores had developed on the entire glans penis; one year later, the entire penis had been amputated. Three years later, he had developed swelling of the right testicle. A Wassermann test made at the Long Island College Hospital was said to have been four plus. Thereupon, he had been given three arsphenamin injections. In 1923, both testicles became swollen and painful, and he was confined to his bed for twenty-five days. He was given seven more arsphenamin injections. He was advised to have both testes removed, although Dr. Morton of the Long Island City Hospital advised against it, as he considered the condition to be of syphilitic origin. On examination both testicles appeared to be in fair condition. The left epididymis was indurated and somewhat nodular. There were three fistulous openings, which were believed to lead to the testicles, above the epididymal mass. The neurologic examination

was negative; two Wassermann tests on April 10 and 22, 1924, were also reported negative. However, two injections of neo-arsphenamin and one of silver arsphenamin were given, and were believed to have benefited the patient.

LICHEN PLANUS WITH BUCCAL LESIONS AND FORDYCE DISEASE. Presented by DR. LEVIN.

J. P., a man, aged 27, said that the lesions first appeared on the penis about six weeks prior to presentation. From this site, the eruption spread and became generalized. It was accompanied by pruritus. Examination revealed the characteristic polyhedral, angular based, flattened, shiny, scaly papules, which were violaceous and varied from pinhead to small pea size. These were scattered over the cutaneous surface. The buccal mucous membranes showed discrete and confluent grayish papules and patches. On the vermilion border of the lips, especially near the left corner and on the upper lip, there were numerous discrete and aggregated pinheaded-sized papules, which were elevated and were yellowish and pinkish.

GUMMA AND PERFORATION OF THE HARD PALATE. Presented by DR. PAROUNAGIAN.

N. M., a man, aged 35, a negro, born in the United States, married, reported at the Bellevue Syphilis clinic, March 21, 1924, because of ulceration in the mouth. He gave a history of chancre eight years before, although he had had no secondary manifestations, or treatment, as far as known. The mouth condition was said to be of seven months' duration, and began on the anterior portion of the hard palate to the right of the median line. The four neighboring teeth were extracted because the gums at the site of their insertion exuded pus. His Wassermann test was four plus, and to the date of presentation he had received four silver arsphenamin and one mercuric salicylate injections. The condition had improved remarkably since the treatment was instituted. He also had a large patch of alopecia areata on the occipital region, of some months' duration.

EPITHELIOMA OF TONGUE AND LEFT TONSIL IN TERTIARY SYPHILIS. Presented by DR. PAROUNAGIAN.

G. H., a man, aged 58, born in the United States, was referred to the Bellevue syphilis service from the nose and throat department, on account of the ulceration of the throat and tongue, and a four plus Wassermann test, on May 5, 1924. He said that he did not have a venereal history. About three months previously, he felt soreness on the left side of the throat. Five weeks later, the tongue became sore on the same side; one week later, the submaxillary and cervical glands began to swell. Two weeks before presentation, his left tonsil was removed, and he was referred to the clinic for treatment.

TERTIARY SYPHILODERM OF THE FACE RESEMBLING LUPUS ERYTHEMATOSUS. Presented by DR. PAROUNAGIAN.

G. W., a man, (previously presented at the Manhattan Dermatological Society, April meeting), aged 50, German, had been infected ten years previously, and had been treated by a private physician. He applied to the Bellevue syphilis clinic, March 31, 1923, and received seven injections of arsphenamin. He then developed a severe dermatitis; treatment was discontinued for a long time, and was resumed with mercury only. Early in April, 1924, he

developed papulosquamous patches on the flush area of the face and forehead, which resembled lupus erythematosus. His Wassermann test was strongly positive, and as he had developed these lesions while under treatment with mercury, it was decided to try an organic arsphenamin preparation (three injections), this produced marked improvement.

ICHTHYOSIS. Presented by DR. LEVIN.

F. de M., a youth, aged 16, born in New York City, a schoolboy, came to the clinic on April 21, complaining of a dry and scaly eruption over the arms, legs and chest. This had appeared when he was about 1 year old. It was always worse during the winter. Examination revealed typical large and dry blackish scales, covering the entire body. The skin was dry and showed absence of oil. The face was dry and red. There was marked scaling of the scalp.

EPITHELIOMA OF THE LOWER LIP. EXTENSIVE LEUKOPLAKIA OF THE BUCCAL MUCOSAE AND TONGUE. Presented by DR. PAROUNAGIAN.

G. F., a man, aged 42, born in Germany, single, a waiter, was admitted to Bellevue syphilis clinic on April 16, 1924. He gave a history of having had a chancre twelve years previously for which he had received two intramuscular injections of arsphenamin, and no other treatment. He was well until five months before presentation, when a sore appeared on the lower lip, which persisted. The lesion was circular, and about the size of a silver dime, with elevated borders. The base was warty in appearance. There were no glandular swellings, and no secondary manifestations could be detected. There was marked leukoplakia of the buccal mucosae, tongue and lips. The Wassermann test was 3 plus. The lesion of the lip closely resembled a chancre.

ACRODERMATITIS CHRONICA ATROPHICANS. Presented by DR. SCHEER.

J. D., a man, aged 33, married, born in Russia, who had been in the United States for fourteen years, a cutter, came to the Vanderbilt clinic on April 12, 1924. He had an eruption which first appeared on the right elbow five years before. New lesions appeared from time to time on the rest of the upper extremity and back. Around the olecranon was an area about the size of a quarter, showing distinct anetoderma, the skin being bluish red and wrinkled like cigaret paper. There were irregularly shaped areas of erythema around this lesion. Just below this patch was a reddish blue cutaneous infiltration. There were areas of anetoderma on the dorsum of the right hand and some on the fingers. There were extensive areas of bluish erythema and some infiltration but no anetoderma on the outer side of the right arm and the upper part of the back. There were no lesions on the lower extremities. The patient refused a biopsy. The Wassermann test was one plus.

ICHTHYOSIS. Presented by DR. LEVIN.

S. L., a man, aged 38, an Austrian, a butcher said that the condition had been present since birth. The case was presented because of the interesting family history. Six brothers, three sisters, the patient's mother and his mother's mother had a similar condition. He presented a universal itching condition of the skin which was characterized by dryness, scaliness and thickening of the superficial layer of the skin.

EPITHELIOMAS OF THE LEG. Presented by DR. PAROUNAGIAN.

J. R., a man, aged 48, single, born in the United States, a laborer, was admitted to the Bellevue clinic, Jan. 21, 1924, on account of extensive ulcerations on the middle portion of the left leg, which had persisted for two years. One and one-half years before presentation, he had been treated at the New York Post-Graduate Hospital with roentgen rays, without result. Although he said that he did not have a venereal history, and although he had repeated negative Wassermann reactions, he was given six silver arsphenamin and two neo-arsphenamin injections, which did not improve the ulcers. There were a number of deep ulcers with irregular and elevated borders, with foul smelling discharge. A biopsy was made, but a report had not yet been made.

DERMATITIS MEDICAMENTOSA (IODIDS). Presented by DR. SCHEER.

H. D., a youth, aged 16, born in the United States, a workman in a shoe factory, came to the Vanderbilt clinic on April 5, 1924, for an eruption which had been present three weeks. He said that he had been taking a tonic containing iodids for several weeks prior to the outbreak of the eruption, and that he was still taking the medicine. He presented vesicular and bullous lesions scattered all over the body, from the scalp down. On the trunk, especially on the back and in the lower lumbar region, the lesions were grouped, suggesting the picture seen in Duhring's disease. There was little itching.

GRANULOMA INGUINALE. Presented by DR. CANNON.

S. J., a man, agegd 29, negro, dishwasher, a native of South Carolina who had been in New York for two years, whose personal and family histories were negative, had a condition that began in May, 1922, with a urethral discharge followed in three weeks by a penile lesion and a dime-sized ulceration in the right groin. He was given six injections of arsphenamin and six of mercury, but this medication had no perceptible effect on the appearance of the ulcerations. He was admitted to the City Hospital in June, 1923, with an ulcer in the right groin, 1 inch (2.5 cm.) in diameter. The diagnosis of granuloma inguinale was made and the Donovan bodies were found. He was given eight doses of antimony potassium tartrate and discharged on Sept. 6, 1923, with a healed lesion. One month later, the ulceration reappeared at the original site and had continued to spread. The patient was readmitted to the hospital on May 1, 1924. There was a verrucous, crusted, undermined ulceration with numerous sinuses discharging a thin, mucopurulent and sanguineous exudate in the right inguinal region, groins and sides of the scrotum, extending back almost to the anus. The Wassermann, spinal fluid and urine tests were all negative. Donovan bodies were found in the smears. A biopsy report showed granulation tissue only.

PSORIASIS IN A SYPHILITIC NEGRO. Presented by DR. PAROUNAGIAN.

R. N., (previously shown at Manhattan Dermatological Society, February, 1924), a man, aged 42, a negro, born in the United States, a carpenter, was admitted to Bellevue clinic, Feb. 11, 1924. He gave a history of a genital sore twenty-three years before, the scar of which was noticed on the glans penis. His Wassermann test was four plus. He presented a typical generalized itching and scaly eruption, well marked on the extensors and scalp, which was said to have been of two months' duration. There was some question about

the diagnosis, and as the patient had a strongly positive Wassermann test, he was placed under antisyphilitic treatment (six arsphenamin and seven mercuric salicylate injections), which did not remove the lesions. A microscopic examination made by Dr. Satenstein at the Vanderbilt clinic was reported to have shown psoriasis. No local applications were made.

GUMMA OF THE RIGHT TESTICLE. Presented by DR. PAROUNAGIAN.

Y. R., a man, aged 28, single, born in Porto Rico, applied to the Bellevue Syphilitic clinic on Dec. 26, 1923, for treatment of a swollen testicle. His history was rather vague. He was said to have had a chancre about ten years before, but he had received no treatment. Six years previously, his left testicle had been removed (cause unknown). On admission, the Wassermann test was reported doubtful, but one week later the report was four plus. He received two injections of arsphenamin and two of mercury, and discontinued his visits, returning on April 30, 1924. The examination revealed marked swelling of the right testicle and scrotum, with a painless thickening of the epididymis, no signs of hydrocele could be detected. The Wassermann test was made before resuming treatment.

SYMMETRICAL TERTIARY SYPHILODERMS. Presented by DR. LEVIN.

M. W., a man, aged 47, unmarried, presented an eruption that had been present for one year. He denied venereal infection. The lesions were found on both forearms, on the legs and ankles. The eruption was made up of flat and elevated, brownish and copper-colored, hard, infiltrated tubercles. These showed grouping in segments of circles. Where active lesions had disappeared, brown pigmented patches and flat smooth scars were visible. Scaling and wrinkling were present. The Wassermann test of the blood was four plus.

DR. LEVIN said that he had seen the patient about twelve days prior to presentation. At that time, his general appearance suggested a condition of syphilis of the central nervous system. The eruption for which he presented himself suggested psoriasis as well as lichen planus, but the color, the scars, the atrophy and the tubercles suggested tertiary syphiloderm. This was confirmed by the Wassermann test, which was four plus. Although the patient was given only protiodid of mercury by mouth, the lesions had faded to quite an extent. He was to be given active antisyphilitic treatment.

ERYTHEMA MULTIFORME BULLOSUM. Presented by DR. LEVIN.

F. A., a man, aged 26, a bookkeeper, had had a recurrent itchy eruption for two and a half years. The attacks came on every three to six months, and lasted for about two weeks. The present attack appeared about two weeks before presentation, with red swellings and blisters on the hands, feet and mouth. When first observed, two days after the onset, he had large erythematous macules and papules. The larger lesions and the tubercules were surmounted by bullae. The lips, mouth, hands and feet were affected. There was a slight general disturbance at the onset. When presented, the lesions were desiccating and covered with crusts.

GUMMA OF THE SCROTUM. Presented by DR. PAROUNAGIAN.

J. B. Mc C., a waiter, aged 51, married, born in the United States, was admitted to the Bellevue syphilis clinic on March 28, 1924, with a history of

having had gonorrhea twenty years before. He had no knowledge of syphilitic infection. He said that five years before, he underwent an operation for inguinal hernia (right side). Since then he has been subject to swollen testicles twice a year, accompanied by breaking down, discharge of a gummy substance, and subsidence. The present condition was said to have existed for two months. Examination revealed marked swelling of the scrotum, especially on the right side, with a profuse gummy discharge, with bloody stain. The Wassermann test was reported to be four plus on March 31, 1924, and antisyphilitic treatment was instituted, with marked improvement. There were a number of typical syphilitic scars on the forearm and elsewhere, which aided in the diagnosis. A photograph was submitted, showing the size of the ulcer at the lower portion of the organ, also punctate scars on the right forearm.

VON RECKLINGHAUSEN'S DISEASE. Presented by DR. PAROUNAGIAN.

H. K., a man, aged 28, single, born in the United States, a piano action maker, came to the Bellevue clinic on April 16, 1924. He presented an enormous number of tumors, varying in size from that of a pinhead to that of a walnut. Some were pedunculated, others flat. There were a number of large pigmented patches. The condition was said to have been present since birth, and no other member of the family was known to have had it. The man's mentality was good, and the Wassermann test was reported negative.

IDIOPATHIC KELOIDS. Presented by DR. LEVIN.

M. W., a colored woman, aged 36, married, a native of Virginia, said that eighteen years prior to presentation she was bitten on the right shoulder, and subsequent to the healing of this wound, a keloid developed on its site. Later, two or three more developed. About two or three years before, she underwent an operation for the removal of these keloids. These soon recurred, however, and others developed. On examination, fifteen keloids were revealed, scattered over the back. These varied in size and shape. Some were as small as a bean, and others as large as the palm of the hand. They were irregular, fig shaped and elevated above the surface of the skin. They felt hard, and infiltrated the deep subcutaneous tissue. The lesions were sensitive, and accompanied by itching and burning. There were several smaller lesions distributed over the arms and chest. The Wassermann test of the blood was negative.

CHANCROID: IMPROVEMENT WITH ACRIVIOLET APPLICATIONS. Presented by DR. LEVIN.

J. C., a man, aged 36, unmarried, was referred to the Cornell clinic for the treatment of an obstinate ulcer on the frenum of the penis which had persisted for three and one-half months, which had resisted all forms of treatment, both local and general. He had received two intravenous injections of arsphenamin and ten intramuscular injections of mercuric cyanid. The blood Wassermann test on three occasions was negative. Examination revealed an ulcer on the frenum, measuring about 1½ by 1 inch (3.5 by 2.5 cm.). This was irregular, with a soft inflammatory border and ragged uneven floor which was grayish and exuded pus. A microscopic examination of the secretion from the ulcer revealed numerous Ducrey bacilli. The man was put on local treatment consisting of the application of 1 per cent. solution of acriviolet.

ERYTHEMA SCARLATINIFORME. Presented by DR. LEVIN.

S. G., a woman, aged 47, married, presented herself at the Cornell clinic on April 25, complaining of an eruption of two days' duration. It was intensely pruritic. She had had a similar condition previously. Once a year, for about sixteen years, she had had recurrent attacks. The first two attacks came on during pregnancies. All were preceded by gastro-intestinal disturbance and were followed in four days by desquamation. On admission, she presented a generalized eruption of large, diffuse bright red patches, made up of macules and papules. Four days later, she showed a fine desquamation. When presented, some of the diffuse, erythematous areas had disappeared. Large desquamating red areas on the extremities were especially marked.

DARIER-ROUSSY SARCOID. Presented by DR. LEVIN.

J. P., a woman, aged 36, an Italian by birth, married was previously presented and showed large characteristic lesions of the hypodermic type of sarcoid. She showed marked improvement after injection of tuberculin. After a disappearance of some of the lesions and a flattening of others, she stopped treatment. She returned for treatment about two months before the second presentation, and since that time had received five more injections of tuberculin. Since then, improvement had been marked, and there had been distinct loss of infiltration and pigmentation of the lesions.

TUBERCULOSIS CUTIS DISSEMINATUS. Presented by DR. PAROUNAGIAN for DR. LAVALLE.

Mrs. S., a woman, aged 31, born in Spain, whose family history was negative for tuberculosis, recalled having had a similar eruption about seven years previously, which had lasted about six months and disappeared. The duration of her present skin trouble was said to be one year. The lesions were extensive, involving the extremities mostly in patches; they were dark brownish, and did not itch. The patient had positive clinical and roentgen-ray findings of pulmonary tuberculosis. Repeated Wassermann tests were reported negative. A biopsy was made, and Dr. Symmers reported tuberculosis of the skin.

CARCINOMA OF THE BREAST WITH METASTASIS TO THE SKIN: ROENTGEN-RAY BURN. Presented by DR. CANNON.

C. B., a woman, aged 64, born in the United States, a housewife, had an irrelevant personal and family history. In March, 1922, in passing her hand over the right breast, she felt a hard lump about the size of a pigeon's egg deeply embedded in the breast, about one and one-half inches to the inner side of the nipple. She consulted her family physician immediately; he assured her of the benign character of the tumor, and treated it with light for two months. By this time, the lump had grown to the size of a small lemon. In May, 1922, the right breast and the glands of the right axilla were removed. The wound healed rapidly. In May, 1923, she noticed a few pea-sized, red lumps in the skin around the scar. In January, 1924, the left breast became enlarged, hard and red, and by March, 1924, had increased to twice its original size. From May, 1923, to April, 1924, she received eleven roentgen-ray treatments of the right anterior chest, and in March and April, 1924, had six treatments of the

left breast. Following the tenth roentgen-ray treatment, she developed redness and vesiculation over the scar on the right chest, and the same area became ulcerated after the eleventh treatment. The entire anterior chest had been extremely painful for three weeks, the patient requiring opiates for the relief of the pain. The left breast had decreased in size one-half since the beginning of the roentgen-ray treatments. Over the scar at the site of amputation of the right breast was an ulceration 4½ by 3 inches (10 by 7 cm.) in diameter, with a necrotic base and irregular sloping edges. In the skin surrounding this ulceration and in that extending into the right supraclavicular space and downward over the abdomen on a level with the umbilicus and over the right side to the posterior axillary line, were numerous nodules varying in size from 2 mm. to 2 inches (5 cm.) in diameter. They were hard, deeply infiltrated and freely movable with the skin. They were elevated, round, smooth, shiny and varied in color from light red to dark violaceous. There were telangiectatic blood vessels in some of the lesions. The left breast and skin were brownish to dark red. The involved area measured 13 by 7 inches (33 by 18 cm.) in diameter and was intensely hard. The glands in the axillae, neck and groins varied in size from that of a pea to that of an English walnut.

LICHEN SCROFULOSORUM. Presented by DR. ABRAMOWITZ.

R. S., a boy, aged 4 years and 2 months, was born in this country of Russian parents. When he was 9 weeks old, he had whooping cough, which lasted almost one year, during which time he had several convulsions. Following this, he had measles and chickenpox, and three months before presentation he had an attack of pneumonia, which lasted two weeks. He had always been subject to colds and suffered considerably from bronchitis. Following the whooping cough, the mother noticed an eruption similar to that which the child had at present, which faded at times, but since the attack of pneumonia had become more marked. The patient was the only child, the father and mother giving no history of tuberculosis. The eruption that the child presented was located on the trunk, the elbows, and knees, and appeared as pin-point, shiny, follicular, white papules, which were mostly grouped, forming patches oval and irregular in shape, which varied in size from one-half to 2 inches (1 to 5 cm.) in diameter. Most of the patches were located on the abdomen and the backs of the elbows. There was little scaling and no redness. The child appeared somewhat anemic, and had a slight cough, but otherwise seemed healthy.

DOUBLE CHANCRE OF LABIA MAJORA. Presented by DR. PAROUNAGIAN.

G. W., a negress, aged 25, born in the United States, single, a domestic, reported at the Bellevue syphilis clinic on April 16, 1924, with two circular sores, one on each labia majora. She had been exposed three and two weeks before, and the duration of the condition was said to be one week. A Wassermann test on the day of admission was negative. Dark-field examination on April 23, 1924, was positive. The lesions were about the size of a silver dime, sharply circumscribed and indurated.

EXTENSIVE SYPHILITIC ALOPECIA. Presented by DR. PAROUNAGIAN.

A girl, aged 19, American, domestic, said that the period of infection was not definite, but her exposures began eleven months before. In the early part

of January, 1924, she suffered with headaches, which were severe at night. This was shortly followed by gradual loss of hair, which was well marked when she applied to the Bellevue syphilis clinic on March 14, 1924. On her first visit, in addition to extensive alopecia of the hairy portions of the scalp and body, there were present a faint roseola, general adenopathy and slight leukoderma colli. The young woman received active treatment with arsphenamin and mercury injections, with marked improvement.

ERYTHEMA NODOSUM. Presented by DR. CANNON.

C. D., a woman, aged 26, born in England, who had been in the United States for four years, had a negative personal and family history. She had been married four years, her husband was well, and her one child, aged 3 months, was well. She had had no miscarriages. About April 15, 1924, she noticed a small tender lump just above the left patella, which gradually increased to the size of a lemon and became bright red. Similar lesions had appeared above the right patella and over the front and sides of the legs. She had had a little pain and stiffness of the legs but no chills, fever, or sore throat. Just above the patellae and along the anterior and lateral aspects of the legs were nodules varying in size from 5 mm. to 1½ inches (3.7 cm.) in diameter, irregular in outline, hard and freely movable with the skin. The older nodules were bright red and tender to pressure. The more recent lesions were subcutaneous and could be detected only by palpation. Two Wassermann tests were negative, as were also urine tests and the blood count. A biopsy was taken, but a report had not yet been made.

PERFORATING ULCER OF THE FOOT. Presented by DR. PAROUNAGIAN.

G. D., a man, aged 36, an Italian American, single, a bootblack, was admitted to the Bellevue clinic on April 26, 1921, with the following history: He had had a chancre eight years before on the inner aspect of the thigh (double), which had healed after injection of mercury. He said that he had had no secondary manifestations. For the last three years, he had had a serpiginous squamous syphilid of the left palm. For the past two years, he had had shooting pains in both legs. The Romberg sign was positive, the knee reflexes absent, and the pupils did not react. The ataxic gait increased when the eyes were closed. He received a course of eight injections of silver arsphenamin and mercury, and absented himself until January, 1924. On his return, he said that he had been attending a surgical clinic for the ulcer on the plantar aspect of his left foot, which appeared about one year ago. His Wassermann test was doubtful, as the ulcer was active, and his other symptoms had progressed. A second course was advised, which improved the ulcer appreciably.

LEUKOPLAKIA AND EPITHELIOMA OF THE MOUTH. Presented by DR. PAROUNAGIAN.

M. M., (presented at Manhattan Dermatological Society, April meeting, but report not published), aged 48, German, married, a waiter, reported at the Bellevue syphilis clinic on March 29, 1924, for the treatment of a mouth condition. He gave a history of a genital sore twenty-three years before which was accompanied by right inguinal adenitis but no further manifestations. About the middle of the year 1923, he experienced discomfort in the mouth. On

Jan. 19, 1924, he was examined at the occupational clinic, where his mouth condition was discovered. The Wassermann test was found to be 2 plus. Twelve mercury injections were given, two a week. The blood Wassermann test was reported 4 plus on March 31, 1924. He showed an extensive leukoplakia of the buccal mucosae, tongue and lips. In addition, the mucous membrane of the lower lip exhibited superficial ulcerations which were clinically diagnosed epitheliomatous. The patient was placed under treatment with small doses of neo-arsphenamin and after receiving four injections, showed moderate improvement.

PENILE CHANCRE. Presented by DR. LEVIN.

J. S., a man, aged 76, an Italian, said that the lesion on the penis had appeared about three weeks before presentation. He had been exposed on several occasions recently. He showed a typical, dime-sized, round, clean ulcer, with indurated borders. The Wassermann test of the blood was four plus.

GANGRENOUS BALANITIS; SECONDARY SYPHILIS. PARTIAL DESTRUCTION OF PENIS. Presented by DR. PAROUNAGIAN.

W. D., (previously presented at the Manhattan Dermatological Society), a man, aged 26, single, born in the United States, admitted to the Bellevue clinic on Sept. 17, 1923, presented a sore on the prepuce which was of two weeks' duration. The incubation period was uncertain. On account of iodin, self-applied, six dark-field examinations were negative, and as the Wassermann test became positive, treatment was resumed. On Dec. 23, 1923, gangrene appeared, for which he was referred to the hospital. The condition progressed in spite of various forms of treatment.

OSCAR L. LEVIN, Secretary.

PITTSBURGH DERMATOLOGICAL SOCIETY

Regular Meeting, May 15, 1924.

STANLEY CRAWFORD, M.D., *Presiding.*

PEMPHIGUS (EARLY). Presented by DRS. GUY and JACOB.

A woman, aged 49, Italian, presented a bullous eruption limited to the conjunctivae and the left upper eyelid. The eruption was of nine weeks' duration and developed following extraction of several teeth. Both the palpebral and the bulbar conjunctiva were involved by active bullous lesions and by erosions; in one or two spots, some contraction could be seen. On the left upper lid were two discrete bullae. The general health was good.

DISCUSSION

DR. BUSMAN said that he agreed with the diagnosis, and further said that he believed the intense redness of the gums was the beginning of a pemphigus rather than a case of pyorrhea.

DR. HOLLANDER said that he thought the onset of the disease following the removal of a focal infection was most interesting.

Dr. Crawford recommended that a bacteriologic study be made before arriving at a diagnosis, since the lesions of the gums strongly suggested an infective gingivitis and the conjunctivitis was of a marked inflammatory type with pronounced vascular injection and adhesion between the palpebral and ocular conjunctivae. He felt that small phlyctenules were frequent in infective conjunctivitides, and that in this case it would be well to reserve the diagnosis of pemphigus until further study and observation had been made. The fact that there was no history of faucial or pharyngeal bullae, the short duration of the process and the appearance of the swollen, congested conjunctivae made him consider the condition infective.

Dr. Guy said that in support of the diagnosis was the presence of flaccid bullae on the eyelid, the presence of bullae under the conjunctivae with contraction and considerable loss of mucous membrane in the eye. He considered the close association of oral trauma with development of the eruption of interest, similar association being reported in Ormsby's textbook.

Dermatitis Medicamentosa (Phenolphthalein Eruption). Presented by Dr. Wertheimer.

Mrs. I. B., colored, aged 38, presented over the entire face and neck patches varying in size from that of a pea to that of a five cent piece, of various shapes, slate colored, with sharply defined borders. The condition began abruptly about six weeks before presentation with severe itching. At first she denied having taken any laxative containing phenolphthalein, but later she said that she had been taking Boal's rolls regularly since the eruption began. The blood Wassermann test was positive.

DISCUSSION

Dr. Schwartz said that he believed the condition was of syphilitic nature.

Dr. Jacob said he thought it was a pigmentation other than that due to phenolphthalein.

Dr. Hollander said that he thought the condition was a pigmentary syphilid.

Dr. Wertheimer said that he had considered the pigmentation as being due to syphilis, or to a face powder or to phenolphthalein. Because of the negative history of any eruption, the abrupt onset following the taking of the drug, and the slate color of the lesions, he favored the diagnosis as presented.

Keratosis Palmaris (Arsenical). Presented by Dr. Crawford.

J. S., a man, aged 56, for three years had been developing a thickened area in the center of the right palm. The thickened area was hard, keratotic and at times developed fissures. The condition was persistent. Fifteen years before presentation, he had taken a proprietary preparation containing arsenic, known as Ascatco, over a period of eight weeks, for hay-fever. There was nothing in his occupation to induce the present condition. The blood Wassermann test was negative.

DISCUSSION

Dr. Guy questioned the diagnosis on account of the sharply marginated unilateral lesion without pigmentary or other lesions elsewhere. He favored a diagnosis of squamous syphilid or an occupational keratosis.

Dr. Busman said that he did not agree with the diagnosis as presented, but favored the diagnosis of a syphilitic lesion.

Dr. Hollander said that he thought the condition was a squamous syphilid.

Dr. Crawford said that the discussion was interesting, and that the lesion may have been an occupational keratosis, although there was nothing in the patients history to account for such a development. He said that arsenic could cause the circumscribed lesion in the center of the palm and that this might well occur without a diffuse area of pigmentation over the trunk or diffuse palmar or plantar hyperkeratosis. He did not agree with the diagnosis of hyperkeratotic syphilid as suggested.

Neurotic Excoriations. Presented by Drs. Guy and Jacob.

A middle-aged woman presented a deep ulceration of the scalp over the bregma. The lesion was of thirty years' duration. According to the patient, it began as a "small boil," which was drained; following this, she found it necessary to dig out small white particles to obtain relief from pain. This had been continued until she was seen at the University Dispensary two weeks before presentation, at which time the edges had a hard, rolled appearance suggestive of beginning epitheliomatous degeneration. Two roentgen-ray units had been applied for this reason.

DISCUSSION

Dr. Beinhauer said that the subjective symptoms were typical—crawling and unruly sensations—relieved only by the production of the traumatic lesion. The patient had a typical psychopathic make-up.

Dr. Wertheimer called attention to the case of a woman he had presented before the society, who insisted that small particles of beads had to be removed before relief was obtained. It was a similar history in all these cases.

Dr. Crawford said that this was a most unusual case, and that the digging at the scalp was the result of a psychopathic state of mind. He felt that it would be well to have a psychiatrist examine her. The fact that her two children picked at their scalps caused him to suspect that she was teaching her children the same habit.

Dr. Guy said that of additional interest was the fact that the patient said that her two daughters were similarly affected. They developed a painful spot and obtained relief only when the hair was pulled out, a trichotillomania. This patient had received treatment for syphilis on several occasions.

Pityriasis Rubra. Presented by Dr. Hollander.

E. F., a woman, aged 60, a housewife, presented on the body a red, dry, scaly, excoriated and slightly thickened condition of the skin. The eruption began abruptly about six weeks before presentation preceded by chills and fever.

DISCUSSION

Dr. Jacob said that he did not think the diagnosis as presented was as yet justifiable. He believed it to be a case of senile pruritus with dermatitis.

Dr. Busman said that he considered the condition one of the erythrodermias or a toxic exfoliative dermatitis because of the constitutional symptoms, the infiltration of the skin and the pruritus.

LEUKEMIA CUTIS. Presented by DRS. SCHWARTZ and BUSMAN.

A. K., an Italian boy, aged 3 years, presented over the entire body numerous bluish-red, cherry to hen's egg sized soft and somewhat firm, painless tumors, intermingled with which were yellowish-brown stains. There was enlargement of the cervical, axillary, epitrochlear and inguinal glands. The tonsils were enlarged, and adenoid tissue was present. The nares were almost occluded by hypertrophied turbinates. The blood count revealed a leukocytosis of 15,000, which consisted of 16 per cent. polymorphonuclear cells; 73 per cent. small lymphocytes, 10 per cent. large lymphocytes and 1 per cent. basophils. There was a marked variation in the size and shape of the lymphocytes; myelocytes were also seen. Biopsy revealed a tumor of the corium, the chief characteristic of which was a marked lymphocytic infiltration. The blood Wassermann reaction was negative. Roentgen-ray examination of the chest showed a slight infiltration around the roots of the lungs. The disease began abruptly as a tumor on the wrist four months before presentation.

DISCUSSION

DR. WERTHEIMER said that were one to see this picture in an adult, one would not hesitate to make a diagnosis of sarcomatosis. The presence of the tumors, of various size, shape, color and consistency, favored the diagnosis of sarcomatosis in spite of the blood count and age of the patient.

DR. CRAWFORD said that clinically he would make a diagnosis of sarcomatosis, as the lesions were developing rapidly in the skin and were of the bluish color often seen in this condition, but that the blood findings supported somewhat a diagnosis of leukemia. The biopsy section as presented was unsatisfactory, but he understood a lymphocytic infiltrate was diagnosed, which also indicated that it was a leukemic process. He gave an unfavorable prognosis.

DR. HOLLANDER said that he agreed with the diagnosis as presented because of the blood findings.

H. G. WERTHEIMER, M. D., Secretary.

NEW YORK DERMATOLOGICAL SOCIETY

Regular Meeting, May 27, 1924

W. J. HIGHMAN, M.D., *President*

A CASE FOR DIAGNOSIS: TUBERCULOSIS CUTIS? Presented by DR. HOWARD FOX.

F. L. D., a man, aged 51, an engineer, born in the United States, received a gunshot wound in the left elbow in 1897. The wound eventually healed and gave him no further trouble until December, 1916, when he noticed a small hard mass about 2 inches (5 cm.) from the scar of the old wound. The mass was excised and a histologic examination made, the result of which was not conclusive, though the findings of the pathologist were said to favor tuberculosis. The disease then gradually extended down the forearm in the form of deep-seated, more or less painless ulcerations, which eventually healed and left deforming scars. The wrist and hand became markedly edematous and more or less ankylosed. Two years ago the circumference of the hand measured 12 inches (30 cm.). It was twice the size of the right hand. At the time of

presentation, the edema had lessened under wet dressings and the ulcers had healed, but there were still four discharging sinuses about the webs and lateral surfaces of the fingers. There was marked ankylosis of the fingers. There was no history of syphilis, and the Wassermann test was said to have been negative on three occasions. Cultures from one of the sinuses showed gram-positive cocci in pairs and clumps. There was no growth of any fungus.

Roentgen-ray examinations by Dr. LeWald failed to show any evidence of tuberculosis of the lungs. Roentgenograms of the forearms, wrists and hands showed: a relative osteoporosis of the lower third of the left radius and ulna, the carpal bones, the proximal and distal ends of the metacarpal bones and the first and second rows of phalanges. The osteoporosis, on account of its distribution, was apparently due to diminished use of the extremity, as there was no definite evidence of any destructive bone lesion such as is seen in tuberculosis. There was no evidence of a syphilitic lesion of the bones. although the radius and ulna both showed irregular borders along the interosseous membrane, but this irregularity was equally prominent on the healthy side. Metallic "dust" was also found about the head of the left forearm and hand. The patient was a large, robust man, apparently in fair general health. There had been decided improvement of the hand under treatment by roentgen ray and potassium iodid.

DISCUSSION

Dr. Fraser said he thought that the diagnosis of coccidioidal blastomycosis could be excluded on the ground that the process remained localized in the arm. In this type, multiplication takes place by endosporulation, and in the majority of cases there is early involvement of the lungs and other visceral organs.

Dr. Williams said he thought that the long interval between the gunshot wound and the development of the lesions casts doubt on the etiology of the particular lesions.

Dr. Clark said that any one who saw the index finger alone, and compared it with the one exhibited later of Von Recklinghausen's disease and tuberculosis of the skin and finger, would be struck by the similarity of the two lesions. It gave the impression of a tuberculous granuloma.

Alopecia Totalis. Presented by Dr. Clark.

A. H., a woman, aged 29, born in the United States, a secretary, had had healthy blond hair until twenty-two years previously when, at the age of 7, her hair all fell out and her eyebrows and eyelashes became scanty, as did the hair in the axillae and pubic regions. Thirteen years ago, after a period of nine years, hair apparently started to come in again in patches, but soon fell out in spite of massage and other local treatment. Seven years ago she began active tonic and constitutional treatment, in which she persisted without results for five years. The patient gave a history of a paternal uncle who had always had repeated attacks of alopecia areata; otherwise all the other members of her family have had a normal quantity of hair. Her father had been suffering from some kind of nervous affection for several years. When first seen, two years ago, she had scattered patches of faint down over her head, with an occasional long hair, but eighteen months ago these all fell out, leaving the patient absolutely bald again. For the last year she had been having Kromayer light treatment at intervals of two and sometimes one week, with

the alternate administration of iron and pituitary extract. Over periods of as long as three months, she had taken as much as 18 grains (1.1 gm.) of pituitary extract a day. Her general health had remained fair, and she had been able to be at her work quite regularly, but complained of always being tired at the end of the day. During the last few months, a faint down had apparently started to come in over the entire head, and while it was growing slowly, if at all, up to the time of presentation, none of it had fallen out. No constitutional disease of any kind had been demonstrated; the blood picture was normal when last made, and the patient was presented for further suggestions as to possible new lines of therapy.

DISCUSSION

Dr. Williams referred to a subject with almost total alopecia that he had given Alpine sun treatment. The girl, when first seen, had only a few wisps of hair, and after persistent treatment, she had a good growth of black hair. He thought the prognosis in this case was favorable.

Dr. Bechet said that in a certain number of subjects the hair never returned, even after the most active and varied treatment. He recalled two or three cases which had shown such unfortunate negative results.

Dr. Fordyce remarked that alopecia is one of the mysteries of dermatology; in his opinion, the treatment of total alopecia was practically hopeless. He cited the case of a patient, seen some years since, treated with the Alpine lamp so that the subject was tanned over the entire body, on the theory that the endocrine functions would be stimulated. The hair came in after this universal tanning, but it fell out again.

Dr. Howard Fox referred to cases of complete alopecia of the scalp which he had reported, in which a complete growth of hair had appeared after long and persistent treatment with the quartz lamp.

Leprosy (Incipient). Presented by Dr. Howard Fox.

F. C., a man, aged 25, said that his first realization of life was in an orphanage in San Francisco at the age of 3. At the age of 11 he ran away, and remained in that city as a newsboy for three years. Later, he went to Los Angeles and was arrested and kept in an institution for boys until he was of age. He then worked for eighteen months on a boat in Puget Sound, and again was arrested for some offense for which he remained in state's prison for five years. Eventually, he joined a circus which traveled about the United States, including the Gulf states. The first symptom of the disease, noted in February of this year, was tingling of the fingers (radial nerve distribution) and a "burning sensation" on the inner aspect of both knees. When first seen at the Riverside Hospital, he presented several lentil-sized bluish-red areas on the dorsal surfaces of the fingers. In addition, there were symmetrical quarter-dollar sized patches on the inner aspect of each knee. They were smooth, light yellowish-brown, and were moderately anesthetic. There was no distinct enlargement of the ulnar nerves. There were no other symptoms suggestive of leprosy. A piece of tissue was excised from each of the patches on the knees on different occasions. The histologic report of Dr. J. Frank Fraser was that the tissue showed only simple inflammatory changes. Sections stained for bacilli were negative. During the last month, the patches on the knees had almost entirely disappeared and there was no further tin-

gling or redness of the fingers. The Wassermann test was negative. He was then given potassium iodid to increase the nasal secretion, and smears made from the nasal septum showed a few crumped acid fast bacilli, undoubtedly of lepra. He had not received any treatment by Chaulmoogra oil.

DISCUSSION

DR. FORDYCE said that he had succeeded in demonstrating bacilli by a prolonged search in tissue removed from anesthetic lepers which had been fixed in absolute alcohol, and that Dr. Fox deserved much credit for making the diagnosis in the case presented.

CARCINOMA OF THE TONGUE. Presented by DR. BECHET.

R. D., a man, presented himself at Dr. Whitehouse's clinic a few days previously, complaining of a large sore on his tongue which had been present for three months. On inspection, a large deep crateriform ulcer on the dorsal surface of the tongue was seen. It was about 1 inch (2 cm.) in diameter and was covered with cauliflower-like granulation tissue. The borders of the ulcer were markedly indurated At its periphery, the margin of a typical patch of leukoplakia was discernible. There were also numbers of other typical patches of leukoplakia on the buccal mucosa. The man had consulted someone at the incipiency of the lesion who, finding the Wassermann reaction 4 plus, administered in the interval of a few weeks six arsphenamin injections and five intramuscular injections of mercury. The patient stated that the tongue became very sore within a week or two after the first two injections of arsphenamin, and the subsequent development of the lesion became extremely rapid.

DISCUSSION

DR. SCHWARTZ said that he agreed with the diagnosis.

DR. FORDYCE said that he agreed with the diagnosis of carcinoma, and spoke of the frequent mistakes in diagnosis when carcinoma of the tongue occurred in persons with a positive Wassermann reaction. In these patients, the objective signs of carcinoma were overlooked and the condition was treated as syphilis. The favorable time for operative interference was delayed by long employment of arsphenamin. He had the impression that the drug might stimulate the cancerous growth, but there was no absolute proof that such was the case.

DR. WILLIAMS told of a case in which he had had just the opposite experience to that of Dr. Fordyce, that of a man undoubtedly with a syphilitic ulcer of the cheek. Six weeks of treatment reduced the infiltration and the size of the ulcer, but left a hard epithelioma, but it was distinctly smaller at the end of six weeks.

DR. CLARK reported a similar case of a patient who had had syphilis for a long time and generalized leukoplakia of the tongue involving the anterior half, tip and also the sides of the cheeks. The patient, who saw one of the members of the Dermatological Society, presented an ulcerating lesion, though not so deep as in this case. He was referred to a surgeon, who pronounced the case carcinoma of the tongue and recommended removal of the tongue. At that time there were hard glands in both submaxillary regions. The man was not satisfied and went to another surgeon, who confirmed the diagnosis and

made a similar suggestion, and also to a third. Later, he was referred by his brother to Dr. Clark to ascertain whether anything could be done, as he had refused operation. Several bad teeth were removed and antisyphilitic treatment was given, and the general condition of the mouth improved, although the lesion of the tongue remained in about the same condition as when first seen. As the man had refused operation, radium needles were inserted around the lesion on the tongue, directed toward a central point beneath the lesion, and these were left in place for four hours. That was in February, 1923. The man consented to have the glands in the neck removed, which was done after the insertion of the radium needles and while the glands were hard, not one showed any metastatic involvement. That was interesting, as it has been taught that complicating hard glands in the neck are usually metastatic. The lesion on the tongue cleared up, and remained so, with a good smooth surface; that was a year ago last February. The lesions may recur, but the case responded well to radium.

Dr. Bechet said that the patient gave a distinct history of a marked aggravation in the condition following the use of arsphenamin. A certain number of cases had been reported of the rapid development of an epithelioma on an old macerated patch of leukoplakia, following the administration of arsphenamin. Whether arsphenamin really played an etiologic part in a chronic degenerating patch of leukoplakia or only accelerated the epitheliomatous change, he was not prepared to say; but it had been his observation, as well as that of others, that at times its administration seemed to greatly stimulate malignant changes in a degenerating patch of leukoplakia.

Epithelioma. Presented by Dr. Fordyce.

A woman, aged 28, showed a circumscribed lesion below the right eye, rather inactive, having the appearance of an epithelioma. It had some resemblance to the morphea type which has been described.

DISCUSSION

Dr. Clark said he agreed with the diagnosis of superficial benign epithelioma; it showed an atrophic center with slightly raised rolled edges.

Dr. Williams said that it could probably be cured by radium, by caustic treatment, curettage, or some other method.

Dr. Fordyce referred to the treatment of small eyelid epitheliomas by electrolysis. This method was usually successful, with little scarring. He employed from 3 to 5 milliamperes after local anesthesia with procain.

A Case of Mycosis Fungoides. Presented by Dr. Fordyce.

A man, aged 81, had an indefinite history of skin trouble for two years. The patient had areas of scaling dermatitis on the back, some of which were infiltrated and had annular outlines, suggesting mycosis fungoides. The left cheek was the site of a large, dark red tumor, about 2 inches (5 cm.) in diameter. The histologic examination of a lesion removed from the back showed a dense subepidermic infiltration of small lymphocytes, suggesting a leukemic picture rather than a mycosis fungoides. The blood count was normal.

DISCUSSION

DR. FRASER said that he thought the case belonged to the group of malignant lymphoid hyperplasias. Some of these originated in the skin and others in the lymph nodes. He could not elicit from this man whether the diffuse infiltrated plaques on the back developed before or after the tumor nodules. It was probably a case of mycosis fungoides, and if the tumor nodules developed before the dermatosis it should be recorded as belonging to the d'emblée type of Vidal and Brocq. He had recently encountered a case which ran a clinical course corresponding to that of mycosis fungoides; one of these patients came to necropsy, and a report was in preparation that would probably aid materially in establishing the view that mycosis fungoides, lymphatic leukemia and lymphosarcoma were conditions representing variations of the same fundamental disease. The duration of life in such patients depended not so much on the intrinsic size of the growth as on the site of its origin. Cases originating in the skin, especially those occurring as diffuse infiltrations, might extend over long periods, from five to twenty years, while those originating in the lymphoid tissue of mucous membranes ran a brief course to a fatal termination.

DR. FORDYCE inquired as to the possibility of diagnosing mycosis fungoides in the premycotic period from the histologic picture.

DR. FRASER replied that, in his experience, it was not always possible to make a diagnosis from the histologic picture in these lesions, unless cells showing a high chromatin content and certain nuclear changes such as mitoses and a tendency to formation of giant cells were present. These characteristics were not always present. He had seen cases running a course corresponding to the clinical picture of mycosis fungoides, in which the histopathologic picture was that of a low grade subacute or chronic inflammation. From such a picture a diagnosis would not be possible.

DR. BECHET remarked that the infiltration was quite marked in the plaques over the shoulder; some of them were almost nodular in character. The lesion on the face was sarcoid-like in appearance. No definite diagnosis could be made from a single observation, but the possibility of mycosis fungoides should be taken into consideration.

DR. HIGHMAN said that he thought it was one of the most interesting cases seen in a long time. The patient said definitely that the lesions of the body had preceded the one on his face by six or seven months. The latter looked very much like the leukemic tumors described by Kaposi. A section from a lesion on the right scapula looked like leukemia or lymphosarcoma, and he did not think it would be possible to differentiate between the two. Recently, in looking up the literature on mycosis d'emblée, Brocq said that histologically and clinically this form could not be distinguished from sarcoma. Dr. Highman said that he agreed with the remarks of Dr. Fraser in toto and thought the wheel had revolved to its starting point, before all of these conditions were considered under one head and when all these latter day distinctions had not yet arisen. The absence of the typical blood picture of leukemia in this instance might be explained on the basis of its being in the aleukemic state when there was no metastasis into the circulation; it was probably a lymphosarcoma without the blood picture of leukemia and with the general clinical picture of mycosis.

DR. FORDYCE expressed the opinion that repeated blood examinations should be made in these cases which histologically suggested leukemia. The infiltration in the case under discussion was that of leukemia, and recalled the sec-

tions he had seen from Kaposi's case labelled lymphodermia perniciosa. In borderline cases the blood picture might in time show leukemia.

DR. HIGHMAN remarked that Kaposi's case had ended in a general sarcomatosis.

A CASE FOR DIAGNOSIS. Presented by DR. FRASER.

E. C., a woman, married, whose past history was unimportant as related to the condition for which she was presented. The cutaneous manifestations displayed first appeared seven years previously and had persisted. On the dorsum of the hands and forearms were irregularly-shaped erythematous areas in a thin wrinkled skin. Similar areas on the lower portions of the legs showed fine scaling, and color variations from brownish yellow to a reddish purple. Several subcutaneous nodules could be felt along the extensor surface of the forearm. Two of these were over the olecranon process. All of the nodules developed seven years ago coincidentally with the changes in the skin. There was never pruritus, but the patient suffered from the onset with a severe "burning sensation" in the soles. The urine examination was negative. The blood chemistry revealed 160 mg. of sugar. The leukocyte count showed 6,900 white cells, of which 64 per cent. were polymorphonuclears and 36 per cent. lymphocytes. The Wassermann reaction was negative.

DR. HOWARD FOX said that he had seen the patient in the Polyclinic Hospital, and while it was not a classical or decided case as was the one shown by Dr. Fordyce later in the evening, he thought it would fall under the classification of acrodermatitis chronica atrophicans. A number of such cases had been presented recently, showing reddish plaques on the shoulder or arms similar to the case mentioned.

DR. WILLIAMS said that he thought it was acrodermatitis atrophicans, but did not understand the firm nodules on the back of the elbow. They were apparently fibromas and had nothing to do with the acrodermatitis.

DR. HIGHMAN said he thought that it was conceivable that they might be the calcareous deposits seen in scleroderma.

CIRCUMSCRIBED FOLLICULAR KERATOSIS OF ELBOWS AND KNEES: PARTIAL DEPIGMENTATION OF THE FACE. Presented by DR. HOWARD FOX.

A. H., a boy, aged 13 years, colored, said that he had first noticed the eruption on his elbows and knees two weeks previously. He was not sure that it had not been present for a longer time. He thought it was still increasing in extent. The eruption was said to be slightly itchy at times. On the anterior surfaces of both knees he presented sharply circumscribed patches about 2½ inches (6 cm.) in diameter, consisting of discrete pinhead-sized horny follicular papules. The color of the papules was that of the normal skin, the intervening skin showing some exaggeration of the natural lines. There was no redness or other appearance of inflammation. On the left elbow, there was a similar patch, somewhat smaller in size, and on the extensor surface of the left forearm were scattered horny papules. The patient also presented three dime to nickel sized patches on the face, showing partial depigmentation and slight furfuraceous scaling. A histologic section was made from a follicular patch on the knee (by Dr. Fraser). It showed only a slight amount of simple inflammatory change. The horny plugs were not visible in the sections made. There was no suggestion of Darier's disease.

DR. HIGHMAN said that he suggested considering the diagnosis of simple keratosis suprafollicularis.

GRANULOMA OF THE PALATE. Presented by DR. WILLIAMS.

C. G., a man, aged 29, colored, had had the trouble for which he was presented, for about six weeks. There was a papillomatous mass growing from the right side of the hard palate, projecting about one-eighth inch (0.3 cm.) and about one-quarter inch (0.6 cm.) in diameter. The Wassermann reaction was 4 plus, and the mass had shrunken a little under two weeks of mixed treatment.

One suggestion was that it might be a granulomatous mass pushing from a sinus, due to bad teeth. Another suggestion was tuberculosis. He himself thought it was a papilloma with curious features; about three weeks ago the growth had a discharge of a bloody serum, which would give color to the diagnosis of granuloma coming from a sinus. The Wassermann reaction was 4 plus.

MOLLUSCUM CONTAGIOSUM TREATED BY THE ROENTGEN RAY (Previously presented). Presented by DR. HOWARD FOX.

E. R., a youth, aged 17, was previously presented at the March meeting of the Society, showing a large number of typical molluscum lesions on the upper and inner aspects of the thighs. He was treated experimentally by the roentgen ray, receiving one-fourth "skin units" of unfiltered irradiation at weekly intervals. At the end of the fourth treatment there was a noticeable improvement, and after the eighth the lesions on the areas treated had entirely disappeared. During the course of the treatment, there was no change in the few lesions scattered over the body; also a few new lesions had appeared on the parts of the body not exposed to the roentgen ray.

DISCUSSION

DR. WILLIAMS asked whether any one knew the natural history of molluscum contagiosum. How long does it last if not treated, and what happens? Will it cure itself in six months? The patient was treated for six or eight weeks: had the disease not reached a point where the patient would get well without treatment?

DR. FORDYCE said that he thought the result in this instance was definitely due to the roentgen-ray treatment and not to a spontaneous disappearance of the lesions.

DR. FRASER said that the result was excellent. He had seen the patient before treatment in Dr. Fox's clinic. As there were over one hundred lesions, it would have been a tedious procedure to have treated the disease by the old-fashioned methods.

DR. BECHET said he thought that in patients left alone the disease tended to spread either slowly or rapidly; he had never seen a case of long duration without a number of lesions.

DR. HIGHMAN said he has had one clinical experience which might be of some value in connection with Dr. Williams' question; a woman, aged 40, with molluscum contagiosum scattered over the entire body. The lesions were removed, and she came back about twice a year with a new crop.

DR. WILLIAMS said that Dr. Highman's report was interesting indeed and should be recorded. He did not know of any statement of that kind in the literature.

Dr. Howard Fox said that the patient had a number of scattered lesions on other parts of the body which had not been treated by roentgen ray and had not disappeared. In fact, some new lesions had appeared on other areas during the course of treatment.

Dr. Williams remarked that that brought out the point he wished to know.

Tumor of the Buttocks Following Intramuscular Injections. Presented by Dr. Howard Fox.

M. B., a man, aged 40, colored, a cook, was said to have been infected with syphilis six years ago. He was treated twice a week continuously for three years by intramuscular injections of a "milky white fluid." Shortly after the beginning of treatment, he began to suffer from lumps in the buttocks, but in spite of this the treatment was continued. The last injection had been given three years ago. He presented extremely hard, roughly spherical and irregularly lobulated masses in the gluteal muscles of both sides. The masses were about the size of an ordinary grapefruit, were movable on the deeper parts, and the skin covering them was freely movable except at two points where there were small pea-sized depressions. The patient was a large, robust, muscular man, with no excess of adipose tissue.

DISCUSSION

Dr. Fordyce said that in this case the large indurations were due to faulty technic. The injections had been given over a long period without rest intervals and with the drug probably suspended in liquid petrolatum. The lumps in the buttocks were paraffinomas plus the reaction of the tissues from unabsorbed mercury. The employment of a proper menstruum for the mercury was of the first importance. Second, it should be liquefied in the syringe by heating it before injection and deposited in the muscular tissue with a proper syringe and needle. Furthermore, after injection, massage should be employed to spread the injected fluid over a larger area. Indurations seldom follow if the precautions indicated are carefully observed.

Dr. Fraser said that he agreed with what Dr. Fordyce had said. Particles of mercury in the tissues might form a nucleus for the production of a foreign body granuloma, but the paraffin and not the mercury might have been the offending agent. The presence of paraffin in the tissues resulted in the production of characteristic lesions. He had studied microscopic sections from a growth in the arm, following the injection of this material with the object of avoiding military service. The histologic picture was that of typical foreign body giant cells surrounding paraffin crystals, with the formation of new fibrous tissue.

Dr. Howard Fox said he did not know whether the masses were due to the irritation of the mercury or to some mineral oil which may have been used.

Kerion of the Scalp in an Adult. Presented by Dr. Howard Fox.

W. W., a man, aged 36, colored, a hotel porter, had first noticed a "warty pimple" on the occiput three weeks ago. It had increased in extent until it formed a circular, somewhat elevated patch 3.5 cm. in diameter. It was boggy, slightly tender, scaly and covered with a sparse number of short hairs matted together. On pressure, pus exuded from numerous orifices. Microscopic examination of scales showed curved threads of mycelium and clusters of large

spores. Cultures were made. No fungus was found in either hairs or pus. Cultures were made from the hairs, pus and scales, about which a report will be made later. The patient ascribed his disease to a visit to the barber shop.

DISCUSSION

DR. CLARK said that he thought it a very interesting and unusual case. He had never seen any of these cases except those presented by Dr. Fox.

DR. FORDYCE said that he had seen two cases of ringworm of the scalp in adults, which were clinically microsporon infections. The diagnosis was not confirmed by cultures.

DR. WILLIAMS said that he had seen the slide in the morning, and it showed distinct mycelia. He had never seen any such cases himself; Dr. Fordyce's report of finding microsporon in the scalp of an adult was remarkable. All the cases he himself had seen had been megalosporon. He had found kerion in children, caused by the microsporon, but he had been under the impression that all the scalp cases in the adult were megalosporon.

DR. BECHET asked whether Dr. Fox's cases were all in colored people. Dr. Ochs had reported or exhibited a case in a colored person at a recent meeting of the Section on Dermatology and Syphilis at the Academy of Medicine. Dr. Guy of Pittsburgh, in discussing another of Dr. Fox's cases at a previous meeting of the Society, said that he also had observed several cases of tinea in the adult negro scalp. Apparently a majority of the cases recently reported occurred in the negro race, and it would be of interest, if this held true, to inquire into the reason for this predilection, if it really existed.

DR. HIGHMAN said that Dr. Lewendowsky had reported a case of kerion caused by the microsporon, and asked whether it was in an adult or in a child.

DR. WILLIAMS replied that he thought it was in a child.

DR. HOWARD FOX said that ringworm of the adult scalp was nearly always due to the tricophyton. In the study that Dr. Fowkes and he had made, it was found that to date a total of fifty cases had been reported of ringworm of the scalp in adults, which had been proved either microscopically or culturally. Only four cases had previously been reported as due to infection with the microsporon.

TUBERCULOUS ULCER OF THE LIP (Previously presented). Presented by DR. HOWARD FOX.

P. M., aged 25, was presented at the March meeting of the Society for diagnosis. A histologic examination was subsequently made by Dr. Fraser, which showed a characteristic picture of tuberculosis. There were no blood vessel changes suggesting syphilis. A photomicrograph was also presented.

A CASE FOR DIAGNOSIS: SARCOMA? Presented by DR. WILLIAMS.

D. S., a man, aged 47, had a disease that began ten years ago on the left foot, following a frost bite. The condition gradually spread over the left leg, with some spots on the right. It had been much worse for the last year. The left foot showed patches of pigmentation and atrophy, suggesting the pigmented sarcoma of Kaposi, but the growths themselves showed neither pigmentation or hemorrhage. The biopsy report was definitely sarcoma, not sarcoid.

DISCUSSION

DR. HIGHMAN said it was a question whether it was a sarcoma of Kaposi. The mere fact that one did not find the typical lesion in one specimen did not exclude Kaposi's sarcoma.

DR. WILLIAMS said that clinically it seemed to be the sarcoma of Kaposi and ran a course similar to that disease, but that none of the lesions now present showed either pigmentary or hemorrhagic changes.

ZOSTER FOLLOWING ARSPHENAMIN. Presented by DR. FORDYCE.

The patient had typical lesions on the buttocks, thighs and legs. Dr. Fordyce had seen several cases of zoster after arsphenamin. In one patient, supra-orbital zoster was accompanied with a corneal lesion followed by a permanent opacity. Zoster developing during the arsphenamin treatment of tabes might be due to the drug or to involvement of the posterior nerve roots by the disease.

EXTENSIVE NEVUS VERRUCOSUS. Presented by DR. FORDYCE.

The patient, a woman, aged 52, colored, had lesions involving the face, neck and arms and anterior surface of the chest. They were elevated and darker than the surrounding skin. The condition was not congenital.

VON RECKLINGHAUSEN'S DISEASE. Presented by DR. FORDYCE.

The patient, a man, aged 51, showed numerous pea-sized and smaller tumors over the trunk, which had been present for twenty years. He also had an extensive lesion of tuberculosis verrucosa involving the anterior and posterior surface of the left wrist, together with a tuberculous dactylitis of the left forefinger.

DERMATITIS CHRONICA ATROPHICANS. Presented by DR. FORDYCE.

A man, aged 33, had dusky red lesions confined chiefly to the right arm, shoulder and back. The case was noteworthy in its unilateral distribution and duration since infancy, and was somewhat like one presented by Dr. Fraser. The redness was not continuous. Some of the lesions were rather infiltrated.

DISCUSSION

DR. WILLIAMS said that he thought it was a case of acrodermatitis showing the characteristic features of the disease, the preliminary infiltration, the redness, the marked anetoderma over the elbows, and also the band of thin atrophic skin over the ulnar.

DR. HOWARD FOX said that he agreed with Dr. Williams.

PSORIASIS AND EPITHELIOMA. Presented by DR. FORDYCE.

The patient had a generalized psoriasis, with a dime-sized ulcer on the perineum which presented the clinical features of an epithelioma. The history was not clear as to the previous existence of a psoriatic lesion at the site of the epithelioma, nor as to the employment of arsenic. Dr. Fordyce had had several cases of multiple epitheliomas occurring at the sites of psoriatic lesions.

RECURRING ANGIOMATOUS TUMORS OF BACK. Presented by DR. FORDYCE.

Following fulguration of a clinical cavernous angioma on the back of a boy, aged 17, numerous small angiomas developed about the periphery of the

scar tissue resulting from the operation. The secondary growths suggested the possibility that the original tumor might have been angiosarcoma. The histologic borderline between angiomas and angiosarcomas is at times indefinite and confusing.

DISCUSSION

DR. BECHET remarked that the patient gave a history of recurrent lesions; it seemed that the treatment had banished most of the tumors and only remnants were left.

REPORT OF A CASE OF GRANULOMA INGUINALE. (Previously presented). Presented by DR. HOWARD FOX.

G. H., a girl, aged 18, colored, had been shown at the March meeting of the Society as a doubtful case of granuloma inguinale. She presented ulcerations of the genitalia of four years' duration. Subsequently, smears from the surface of the ulcers were made but failed to show the presence of the Donovan bodies. Later, a piece of tissue was excised, and smears made from the tissue with Wright's stain showed numerous clusters of Donovan bodies within the large mononuclear leukocytes. One of the smears was demonstrated at the meeting. A histologic examination by Dr. Fraser showed the presence of a granuloma, which was neither syphilis nor tuberculosis. The ulcers had almost entirely healed under intravenous injections of tartar emetic.

REPORT OF A CASE OF GENERALIZED XANTHOMATOSIS. Presented by DR. HOWARD FOX. (Previously presented for diagnosis) Arch. Dermat. & Syph. **7**:265 (Feb.) 1923, and subsequently as Lymphogranulomatosis cutis, Arch. Dermat. & Syph. **8**:140 (July) 1923.

O. S., a man, aged 21, later returned to Vienna and became a patient of Dr. Riehl. While there, he was seen by Dr. J. B. Shelmire, Jr., who had also seen him in New York. The following description of the further histologic studies has been sent as a personal communication by Dr. Shelmire: "The patient now presents a somewhat different picture from that seen while he was in New York. The lesions on the arms, legs, and trunk are of the same general character as when first seen but are somewhat diminished in size. The face shows the most marked changes, the patient now presenting a picture of diffuse xanthelasma of this region. Here the lesions have the color and consistency of ordinary xanthelasma.

"In this case the entire cutis and subcutis was almost completely composed of xanthoma cells and characteristic crystals with sparsely scattered round cells and epithelioid cells and an occasional giant cell of foreign body type interspersed. In formaldehyd fixed frozen section, the fat of the xanthoma cells takes the typical orange stain of sudan III, and the elongated, somewhat spindle-shaped cholesterin crystals appear as refractile unstained needles. Sections prepared in this manner, warmed and examined with the micropolariscope, show the characteristic 'double breaking of light' in each cholesterin droplet.

"The slides I had the privilege of examining at the Vanderbilt Clinic showed an infiltration limited to lower cutis and subcutis, this infiltration composed of round and epithelioid-like cells and giant cells of foreign body type, as I remember them. It now seems to me that some of these epithelioid-like cells may have been xanthoma cells in an early stage of development. An examination of the recently taken histologic sections leaves no doubt about the fact that the case is one of xanthomatosis."

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